OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME 44, NO. 7
MARCH 28, 1955

AMERICAN

DYESTUFF REPORTER

Devoted to Textile Chemistry
BLEACHING · DYEING · PRINTING · FINISHING

There's No Need to Compromise!

Every one of the Irgalans is a true, neutral-drawing metallized dyestuff and meets the strict standard set for the range when first introduced in 1952!

Consequently you can *depend* upon the Irgalans to give you . . .

- *Exhaustion from a neutral or slightly acid bath—shortened dyeing procedures—minimum impairment of fiber quality.*
- *Good penetration and extremely level dyeing properties.*
- *High light and wet fastness on wool, silk or nylon.*
- *Absence of blocking on nylon.*
- *Generally similar fastness properties and uniform dyeing characteristics—exceptional compatibility in combinations.*
- *Unusual consistency in performance from laboratory to dye-house and from batch to batch.*

If these features are important to you there's no need to compromise. Only a true Irgalan can be called *Irgalan.*

The Irgalans produce a broad variety of generally difficult to obtain shades . . . and the range can be extended with the use of other quality Geigy dyestuffs to include most desired shades. Of particular interest are the Irganols, a new group of non-metallized dyestuffs — excellent companion colors because their neutral drawing and fastness properties are similar to the Irgalans.

Once you have worked with the Irgalans you will find them the most revolutionary, the most acceptable tools you have had in the dyehouse.

*"IRGALAN" and "IRGANOL" are Geigy registered trademarks.

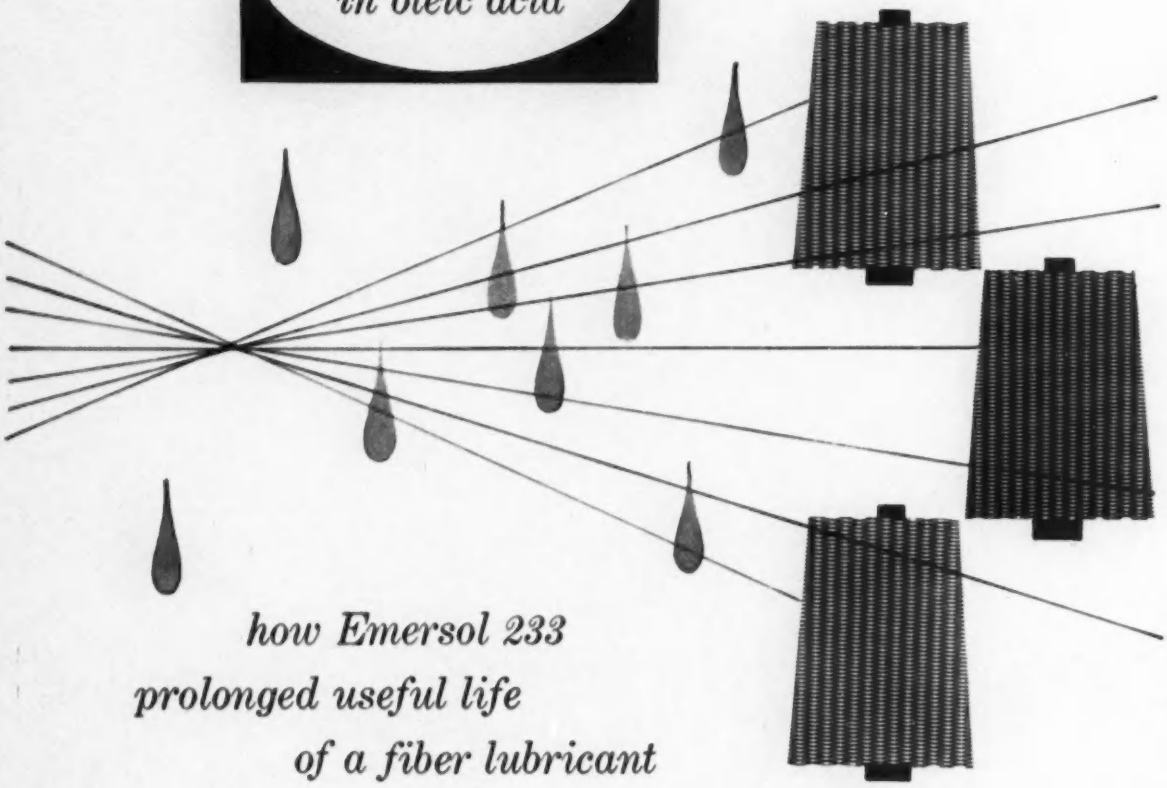
IRGALAN* colors

GEIGY DYESTUFFS
DIVISION OF GEIGY CHEMICAL CORPORATION
89-91 BARCLAY STREET, NEW YORK 8, NEW YORK

Geigy
dyestuff makers since 1859

BRANCH OFFICES: BOSTON · CHARLOTTE, N. C. · CHICAGO · LOS ANGELES · PHILADELPHIA
PORTLAND, ORE. · PROVIDENCE · TORONTO · IN GREAT BRITAIN: The Geigy Co., Ltd., Manchester

aging stability
in oleic acid



how Emersol 233 prolonged useful life of a fiber lubricant

If you have problems with stability during storage of your product, then this customer experience may help you:

Case History No. 12-22 . . . A well-known manufacturer of rayon coning oils in which a double-distilled oleic acid was a major ingredient, became aware of the need for a more stable oleic acid because of more rigid aging requirements. This was due to a greatly increased time lapse between the times of manufacturing the oil and of its removal from yarns prior to dyeing. Knowing of our claims for Emersol 233 LL Elaine, he substituted it for the double-distilled grade in his formulation. Prolonged aging tests proved that Emersol 233 LL Elaine increased substantially the resistance of his coning oil to rancidity and yellowing and gave him maximum assurance against product failures . . . even after an abnormally long aging period.

While Emersol 233 LL Elaine possesses maximum aging stability, these same features of rancidity resistance, color stability and oxidation stability are also inherent in Emersols 220 and 221, however, to a lesser degree, but, still far superior to competitive double distilled oleic acids.

This means that when you use an Emersol Elaine your products will be more appealing, stay appealing longer, and be easier to sell. If you are not already using an Emery Oleic Acid, prove this to yourself by ordering enough for a plant run today.

Emery

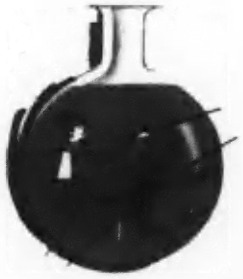
Fatty Acids & Derivatives
Plastolein Plasticizers
Twitchell Oils, Emulsifiers

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

New York; Philadelphia; Lowell, Mass.; Chicago; San Francisco; Cleveland; Keystone Chemical Co., Detroit
Warehouse stocks also in St. Louis, Buffalo, Baltimore and Los Angeles
Export: 5058 RCA Bldg., New York 20, New York

*Trade Mark Reg. Pending
†du Pont Polyester fiber

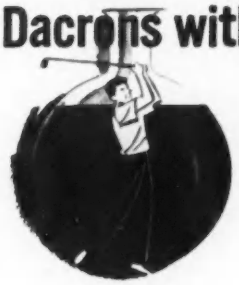
AMACRON RED VIOLET LS



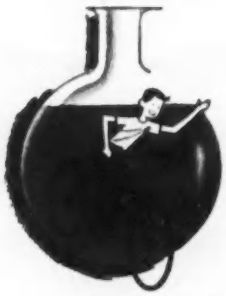
AMACRON ORANGE LS

Glorify your Dacrons with AMACRON* DYES

An all-new range of SUNFAST colors created specifically for DACRON†



AMACRON BLUE RLS



AMACRON RED BLS

AMACRON YELLOW LS

Here at last is a new range of dyes expressly created for Dacron. After years of intensive research, A.A.P. has successfully perfected a group of new colors offering the fastness properties found most essential in the dyeing and printing of Dacron fabric and yarn.

Dyers, finishers, and printers all are finding that the AMACRONS assure amazing sunfastness, together with excellent resistance to washing and sublimation. AMACRON Dyes may be applied to Dacron either in pressure equipment or in open equipment by conventional methods using carriers as needed. All of the AMACRON dyestuffs are distinctively pleasing as self-shades and mutually compatible in mixtures for the production of mode shades of tan, green, brown, grey or black.

For a free copy of our informative brochure, **Dyeing of Dacron,** and data tailored to your individual requirements, consult our nearest branch. A.A.P. technicians will be happy to arrange a trial run at your convenience.

AAP

AMERICAN ANILINE PRODUCTS, INC.

50 Union Square, New York 3, N. Y.
Plant: Lock Haven, Pa.

Branches: Boston, Mass.
Providence, R. I. • Philadelphia, Pa.
Paterson, N. J. • Chicago, Ill.
Charlotte, N. C. • Chattanooga, Tenn.
Columbus, Ga. • Los Angeles, Cal.

Dominion Anilines & Chemicals, Ltd.
Toronto, Canada • Montreal, Canada

WATER REPELLENCY FOR WOOLENS MADE EASY BY THIS ONE-STEP SILICONE

Superlative hand imparted by this new one-package repellent needing no catalyst, mixing, or curing!

Here is a new addition to the family of "*Cravenette*" water repellents that not only brings a new high quality to water repellents for woolens, worsteds, and worsted and Dacron blends, but also new simplicity and economy of application—

No catalyst is needed.

No mixing is needed—just add water.

No curing is needed—drying takes place at 200 to 240 degrees F. in 5 to 6 minutes.

The drawbacks of high-temperature curing are eliminated, cost and freightage of catalysts are eliminated, and there are no problems in mixing.

Quality? Exceptional!

The "hand" is of the finest; more accurately it really is superlative; the fabric is actually up-graded.

Water repellency meets the most exacting requirements; this is equally true of the durability.

Resistance to non-oily spots and stains is similarly high.

However, while these are the results of our own extensive tests, we would expect you to make yours. Telephone and we will be glad to put at your disposal everything you will need to do so. We simply suggest at this stage that if you make woolens, or blends, or make garments from these woolens or blends, or sell such garments this is a new development you will want to know about. Of course, your finisher, too, will be glad to cooperate. The code number for ordering is "*Cravenette*" WSR."

Keep in mind that with this new "*Cravenette*" there is also the "*Cravenette*" tag and label—favorites for almost 70 years with fine merchants and the people who buy their merchandise.

Your Fabric treated with

Cravenette

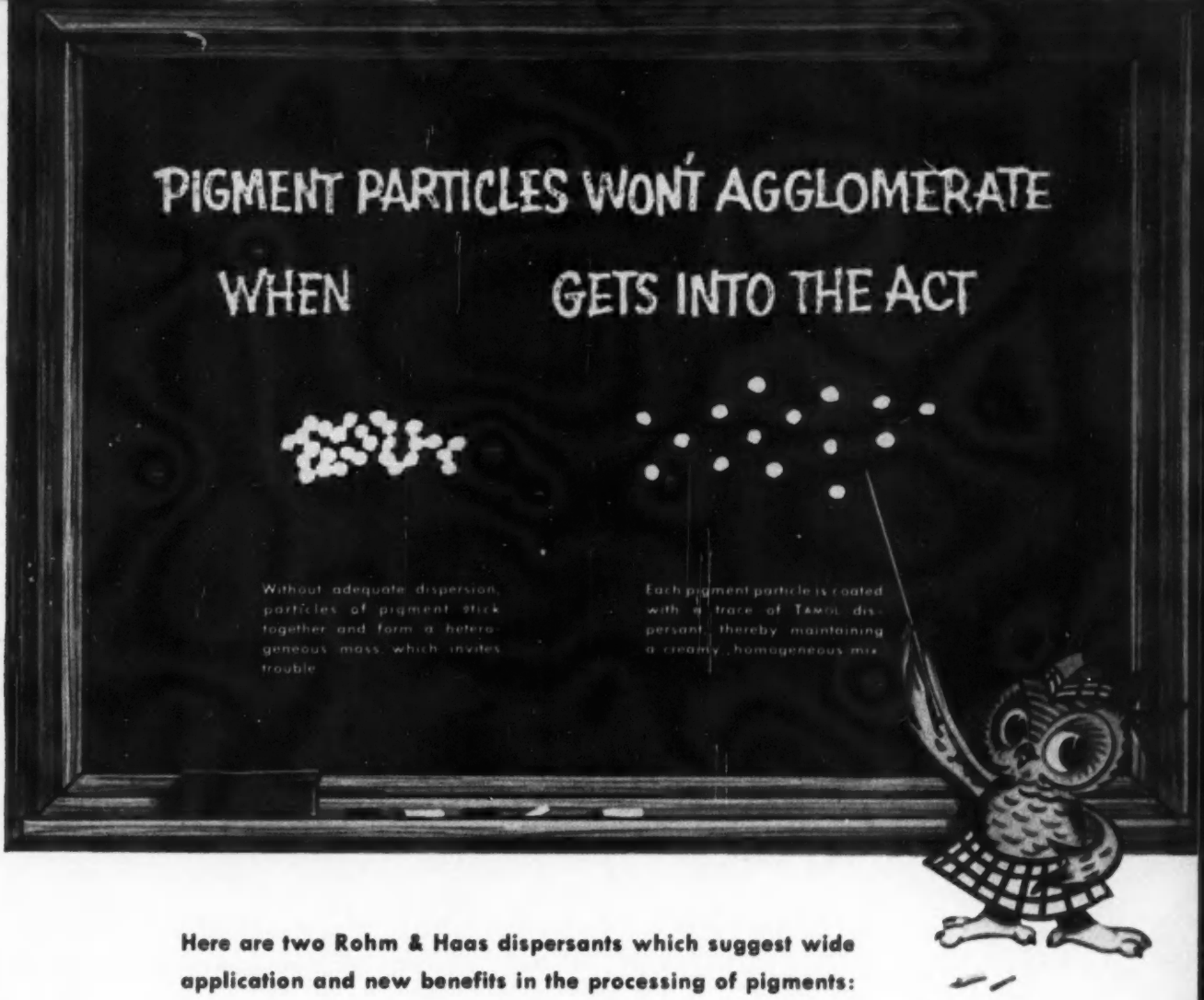
TRADE MARK

WATER REPELLING PREPARATIONS

SHEDS SHOWERS

"CRAVENETTE" is a trademark of The Cravenette Company, U.S.A., 8th and Madison Sts., Hoboken, N. J. manufacturers and sellers of water repelling preparations. The licensed agents of The Cravenette Company, U.S.A. apply these preparations to fabrics and garments.

American Dyestuff Reporter, Vol. 44, No. 7, March 28, 1955. Published every other Monday. Copyright 1955, by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N. Y. Subscription prices: $7.50 U. S. & possessions; $8.50 Canada; $15.00 foreign. Entered as second-class matter Nov. 6, 1919, at the New York, N. Y. Post Office under the act of March 3, 1879.


PIGMENT PARTICLES WON'T AGGLOMERATE
WHEN
GETS INTO THE ACT
Without adequate dispersion, particles of pigment stick together and form a heterogeneous mass which invites trouble
Each pigment particle is coated with a trace of TAMOL dispersant, thereby maintaining a creamy, homogeneous mix

Here are two Rohm & Haas dispersants which suggest wide application and new benefits in the processing of pigments:

TAMOL N is an efficient, economical dispersant for pigment and dyes. Its action upon solids occurs *without* depression of surface or interfacial tension. As a result, there is no frothing or foaming during milling or mixing operations.

TAMOL N is a particularly fine dispersant for carbon black. It is a highly efficient dispersant in print pastes, giving improved printing properties. TAMOL N is available in water solution, designated TAMOL L.

TAMOL 731-25% is a colorless liquid dispersant which is electrolyte-free. It has excellent dispersing activity on a wide range of solids. It will effectively disperse hydrophobic solids like carbon black, and also many of the more hydrophilic inorganic pigments. It is also available in 100% active dry form as TAMOL 731.

TAMOL N and TAMOL 731-25% are both available in commercial quantities.

For complete technical information, write to your nearest Rohm & Haas office.

CHEMICALS FOR INDUSTRY

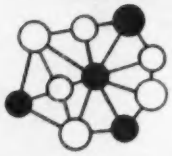
ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

TAMOL is a trade-mark Reg. U. S. Pat. Off. and in principal foreign countries.

WICASETS AND **WICALOIDS** DEVELOPMENTS OF WICA, OFFER UNLIMITED RANGE OF APPLICATION. **WICASETS** ARE EMULSION POLYMERS AND CO-POLYMERS.



WICALOIDS ARE LATEX

COMPOUNDS. BOTH ANSWER THE PROBLEMS OF THE WET

PROCESSOR OF WOVEN

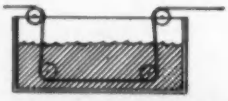
AND NON-WOVEN FABRICS (SYNTHETIC AND NATURAL) AND WARP YARNS.

WICASETS AND **WICALOIDS** ARE USED IN ROLLER COATING,

PUDDLE COATING,

SPRAY COATING,

AND IMPREGNATION.



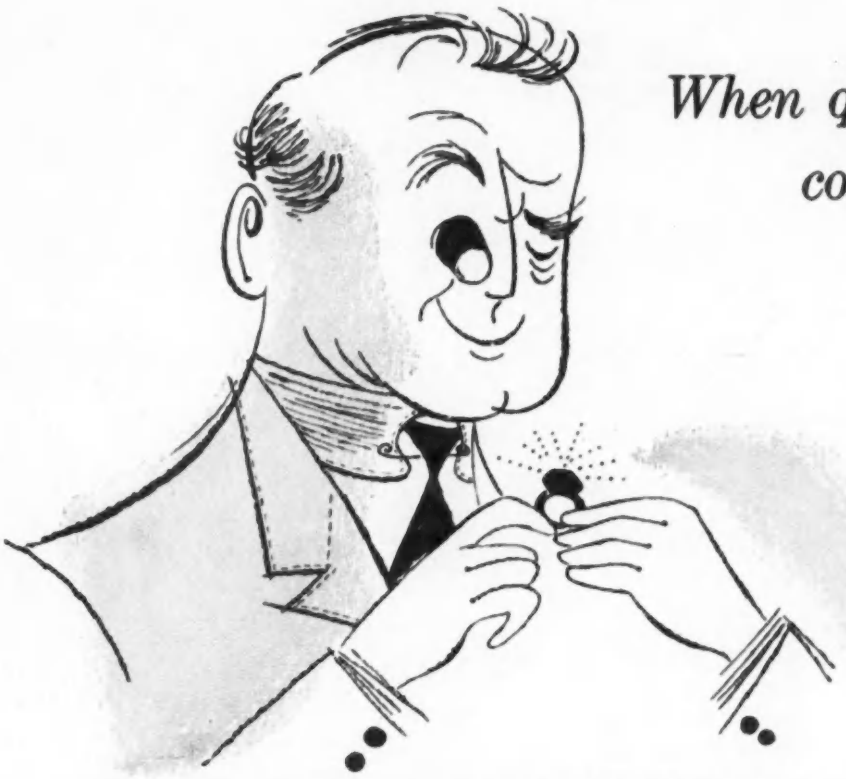
IDEAL IN WORKING WITH FLAT GOODS AND PILE FABRICS. **WICALOIDS** ARE USED ON JUTE, SISAL, AND RAMIE PADS. WICA'S RESEARCH

DEPARTMENT WILL SUPPLY YOU WITH THE ANSWER TO YOUR PROBLEM UPON REQUEST.

Wica

WICA CHEMICALS, INCORPORATED

OLD CONCORD ROAD • CHARLOTTE, NORTH CAROLINA



When quality counts . . .

it pays to go to a specialist

WHEN QUALITY DYE PERFORMANCE COUNTS, IT PAYS TO GO TO

ALTHOUSE

Leading Specialists in Dyes for Cotton — Rayon — Nylon and Other Synthetics and **blends**
For 40 years Althouse research has pioneered in raising textile industry standards of

COLORFASTNESS

This record of leadership assures highest quality performance when you specify these famous, exclusive Althouse dye specialties:

Superlitefasts	Nylanthrenes
Azoanthrenes	Nydyes
Supernylites	Sol-Aqua-Fast

ALTHOUSE

If you sulfonate, or plan to...

ask about Oronite's Sulfonation process without sulfuric acid

Oronite Surface Active Agents

Detergent Alkane
Detergent Slurry
Detergent D-40
Detergent D-60
Dispersant NI-W
Dispersant NI-O
Wetting Agents

If you compound and supply a variety of detergent specialty products or are planning your own sulfonation—it will pay you to inquire about Oronite's process design which eliminates the acid disposal problem inherent in so many sulfonation systems. Oronite, the world's largest producer of *basic* detergent raw materials, also has plant designs, to fill any processing requirements from one to 10 million or more pounds of finished products annually.

Contact any Oronite office for engineering, manufacturing data and personal assistance on your individual needs. Our experience costs you nothing.

ORONITE CHEMICAL COMPANY

"The world's largest producer of synthetic detergent raw materials"

ORONITE CHEMICAL COMPANY

200 Bush Street, San Francisco 20, California
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20 North Wacker Drive, Chicago 6, Illinois
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GET THIS *NEW* CHEMICALS CATALOGUE *by return mail!*

Antara presents a new and completely revised edition of its chemical catalogue, giving basic information on the chemicals it produces.

Information on chemical composition, physical properties and application is given on the established products and on new chemicals released in the past few months. In addition, there is a listing of Antara's intermediates.

For your free copy of the new Antara Chemicals Catalogue, fill in the coupon below and mail it today.

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AD

help!

That's what Morton gives you if you want to know about the best salt... the best salting method... to use in your plant

Almost before you can say, "Why didn't I think of this a long time ago?" we can dispatch a Morton Consulting Engineer in your area to your plant. He's an expert in all things relating to salt. Best of all, his services don't cost you a cent—and they may save you many hundreds of dollars.

Whatever your salt needs are, Morton can fill them promptly and economically. Only Morton has nine strategically located plants to serve you. And only Morton can offer fast delivery from a bag to a trainload, at favorable prices and freight, *anywhere* in the country.

Textile men! If you want the right kind of advice in planning a new brine installation for your plant, or in converting an old one, call on Morton. One of our Brine Specialists will help your engineers plan the most efficient and economical installation for your particular needs.

For fast help from experts—for any kind of salt you need—write:

MORTON SALT
Company
Industrial Division, Dept. AD-3
120 South La Salle Street, Chicago 3, Illinois

CALENDERS

VAN VLAANDEREN MAKES 'EM BETTER

80 TON HYDRAULIC
40 TON HYDRAULIC
15 TON HYDRAULIC
20 TON EMBOSSING

BETTER because Van Vlaanderen's know-how in design is based on 53 years of superior service to the dyeing and finishing industry

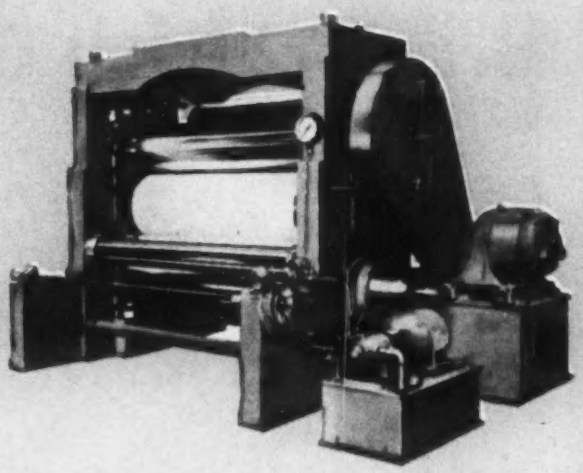
BETTER because Van Vlaanderen's standard of manufacture is the highest — no compromise with quality is ever tolerated.

BETTER because Van Vlaanderen Calenders give long trouble-free service under the severest operating conditions.

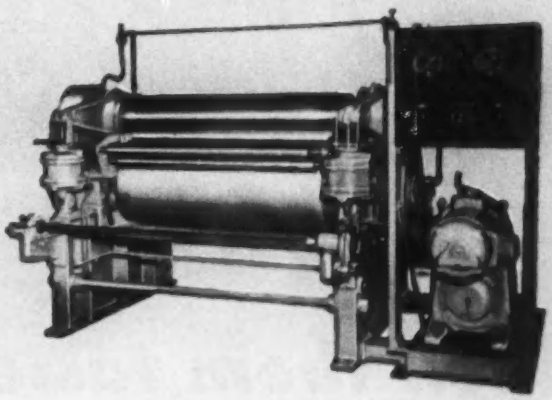
BETTER because you get the highest quality and better production of finished goods on Van Vlaanderen Calenders.

Van Vlaanderen's superiority is based on the correct design of each part to make a smooth operating unit. Take the 80 Ton Hydraulic Calender, for instance. Unit construction eliminates the need for special foundation and anchor bolts. Full 80 ton nip pressure is secured with only 770 pounds of oil pressure. This low pressure is possible because of the exclusive Van Vlaanderen large-area hydraulic ram designed with precision made pistons and four compression rings. Spherical roller bearings enable a 25 h. p. motor to easily drive the machine at 75 y.p.m. 16" top and 20" bottom rolls are made of turned, ground and polished chilled iron, channeled for steam. 22" intermediate roll is of bonded cotton on forged steel shaft.

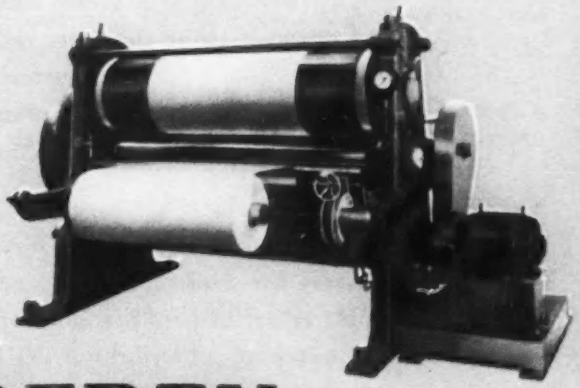
All Van Vlaanderen Calenders have many important quality features. Ask us to send you information on the calender that interests you.



80 TON HYDRAULIC - ALSO MADE IN 40 TONS



15 TON HYDRAULIC



20 TON EMBOSSING

VAN VLAANDEREN

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370 Straight Street, • Paterson 3, New Jersey
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WORLD'S LARGEST MANUFACTURER OF MACHINES FOR PROCESSING MODERN FABRICS

News about

B. F. Goodrich Chemical *raw materials*

Hang this label on your denims and

sell them faster!

SOFTER
STAYS SOFTER
STRONGER
WEARS 2 TO 3 TIMES LONGER THAN STARCH SIZED DENIMS
COLORFAST
DOESN'T RUN OR STAIN ... KEEPS ITS NEW LOOK LONGER
CERTIFIED
BY BENDIX HOME LAUNDRY INSTITUTE ... DOES NOT HAVE TO BE LAUNDERED SEPARATELY

DENIMS sized with Hycar latex are everything the label says and more. Most important, they command a premium price and they move quickly off the counter into the consumer's hands.

Hycar latex size not only does wonders for denims, but also upgrades other textiles. For complete information, please write Dept. CQ-5, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
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Hycar
Reg. U.S. Pat. Off.
American Latex

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

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Another Giant Step Forward In Kelco's Textile Development Program

KELTONE®

print paste thickener of highest viscosity

KELTONE, an extra high viscosity Kelco product for textile printing, gives top quality performance at substantially reduced costs. With **KELTONE** you prepare your print paste thickener to any desired viscosity, yet you use appreciably lower gum concentrations.

You can rely on **KELTONE**'s high viscosity shipment-after-shipment, for **KELTONE** is precisely engineered and manufactured to absolutely uniform standards.

Important, too, is the fact that **KELTONE** is domestically produced, which means better dependability in your source of supply week-in and week-out, year-in and year-out.

KELTONE® a product of **KELCO** company

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DRUSIL

NEW silicone finish ...better for all fabrics —even wool!

Proved by DRUSIL's Million-Yard Test

From Drew—with nearly a half century of experience —comes DRUSIL, the new silicone water repellent with outstanding durability. Tests on more than a million yards of all types of fabrics—including wool—prove DRUSIL's superiority. See how this improved finish can make all your fabrics better . . .

- Exclusive molecular structure makes DRUSIL more stable and adhesive than any.
- Wool may be treated without difficulty, thanks to DRUSIL's lower curing temperature.
- Obtain any hand with DRUSIL, from "soft silky" to "harsh worsted".
- DRUSIL improves abrasion resistance and sewability, without affecting fabrics' tear strength.
- Fabrics retain shade and light-fastness of colors.
- DRUSIL is stable to freezing temperatures.

These are some of the outstanding features that make DRUSIL your best silicone finish buy. Get the complete DRUSIL story . . . write for Data Sheet D-A now!

DREW PRODUCTS

Textile Chemical Division

E. F. DREW & CO., INC.

15 East 26th Street, New York 10, New York

Monsanto TEXTILE TALK

NEW STAR

joins Monsanto's famous team of catalysts!

AC-6 steps up curing efficiency as much as 25%

Resin-finished textiles can now be cured more rapidly—more efficiently.

New AC-6 was formulated by Monsanto for faster catalytic action. It lets you approach complete resin utilization at the lowest possible cure cycle.

Uniformity of resin application is assured by its relatively long bath life. Catalyst AC-6 also permits full development of fabric properties. There is minimum resin add-on—minimum danger of odor formation.

You get all this—and economy, too. Increased catalytic activity is combined with low product cost.

AC-6 is compatible in resin baths with urea formaldehyde, methylated methylol melamine, modified urea resins, and most cationic, anionic and non-ionic softeners and penetrants.

In mill runs on cotton fabric, Catalyst AC-6 has demonstrated its ability to outperform other catalytic agents. When AC-6 was added to the bath, identical fabrics showed superior emboss durability, gloss retention and wrinkle recovery.

Mail coupon today for technical bulletin and sample bottle of Catalyst AC-6.

For faster, low-cost curing . . .

CATALYST AC-6

MONSANTO

Monsanto Chemical Company, Plastics Division
Dept. AD-3, Springfield 2, Massachusetts

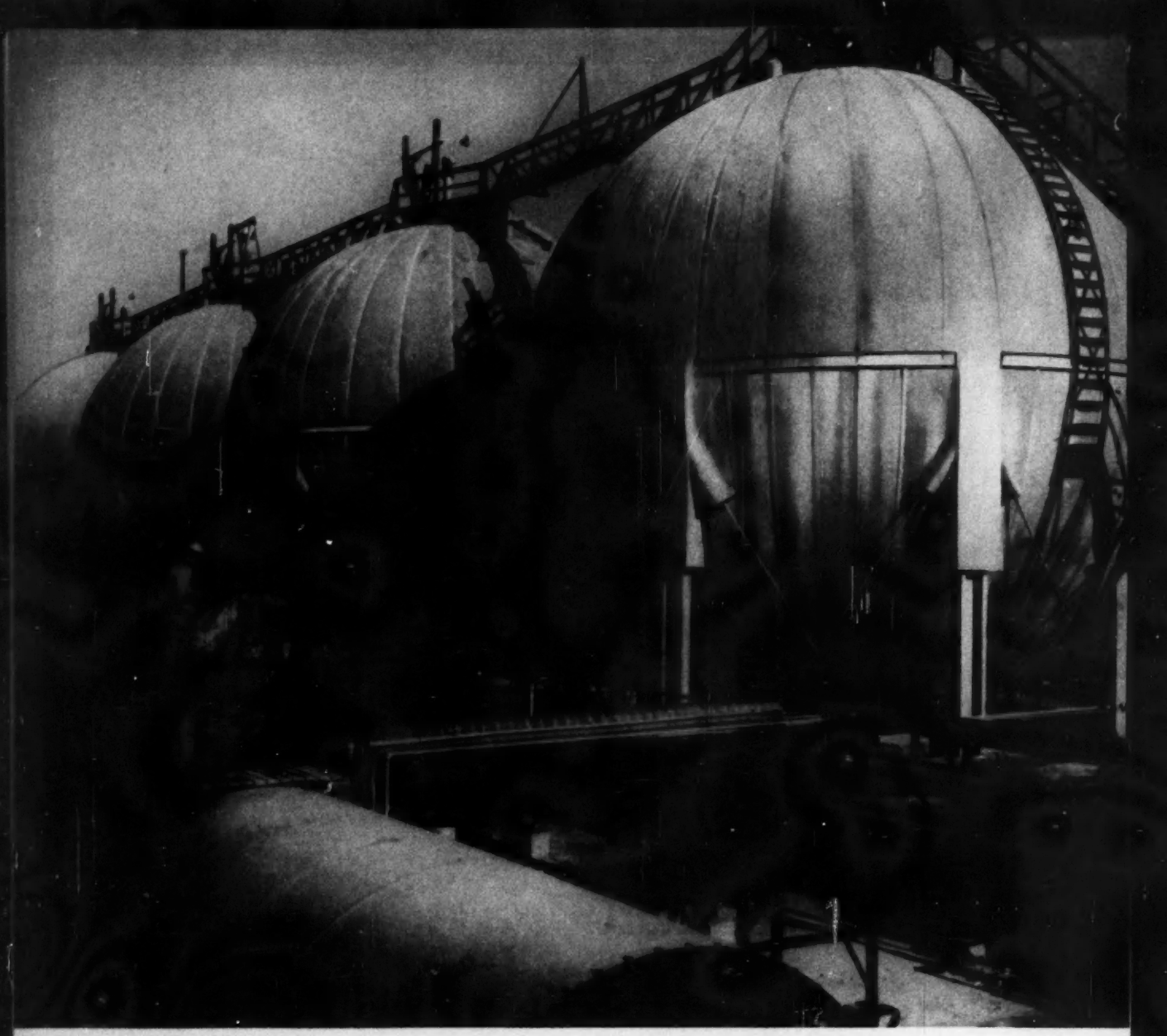
Please send me, without obligation, the technical bulletin on new Catalyst AC-6, and 8-oz. sample bottle.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____



Mathieson Ammonia: *balance means dependability*

As ammonia production climbs to meet growing agricultural and industrial requirements, *dependability* is more important than *availability*. At Mathieson this dependability is achieved through balance and flexibility. Three plants—Lake Charles, La., Morgantown, W. Va., Niagara Falls, N. Y.—provide both commercial and refrigeration grades in key consuming areas. A favorable balance between agricultural and industrial outlets minimizes peak-demand seasonal shortages.

Consider, too, Mathieson's balance and flexibility in the production of other basic industrial chemicals. 6 caustic soda plants, 5 chlorine plants, 7 sulphuric acid plants, 3 major alkali plants, give customers the dependability they want. In addition, Mathieson offers practical technical service in ammonia pulping and aqua preparation, as well as assistance in the application and handling of ammonia and other Mathieson basic chemicals.

Call on Mathieson when planning current or future chemical requirements. Perhaps you can buy to better advantage from one of America's largest producers of basic industrial chemicals.

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION · BALTIMORE 3, MD.

MATHIESON

CAUSTIC SODA · SODA ASH · CHLORINE · SULPHURIC ACID · SULPHUR · AMMONIA · NITRATE OF SODA · BICARBONATE OF SODA · CARBON DIOXIDE · SODIUM CHLORITE · CALCIUM HYPOCHLORITE
ETHYLENE OXIDE · ETHYLENE GLYCOL · DIETHYLENE GLYCOL · TRIETHYLENE GLYCOL · POLYGLYCOLS · DICHLOROETHYLETHER · ETHYLENE DICHLORIDE · METHANOL · SODIUM METHYLATE · ETHYLENE DIAMINE

2767

these new printing colors have been through the mill

Originally custom-made and thoroughly customer-tested, our newest ultra-fast Stabilized Azoics are now offered as a complete range for exacting printing jobs *at moderate cost.*

Many fabrics—including drapery, upholstery, shirting and others previously processed with only the most expensive colors—have been printed with these new Azogens ® and proved fast to light (6-7 in full shades); washing (repeated #4 tests), dry cleaning and plissé. They may be safely resin treated. And because they are made-to-order, they are always dependably fresh.

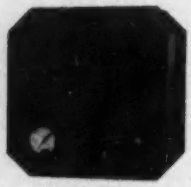
Write for your color swatches today to Blackman-Uhler Co., Spartanburg, S. C.

Azogen Yellow UF-T	***Azogen Brown UF-T***
Azogen Scarlet UF-T	***Azogen Cordovan UF-T***
Azogen Red UF-T	***Azogen Navy UF-T***
Azogen Bordeaux UF-T	***Azogen Navy UF-G***
Azogen Wine UF-T	***Azogen Black UF-T***
Azogen Rust UF-T	***Azogen Black UF-G***

ALLIANCE

BLACKMAN-UHLER CO.
ALLIANCE COLOR & CHEMICAL CO.

Read how Taylor cuts dye jig operating costs!



ONE of the best ways to cut dye jig operating costs and increase production *and* efficiency is to install automatic control. Then you can be certain your shades will go out evenly matched.

The Taylor system illustrated schematically and pictured below in action gives you:

1. Uniform dyeing—by automatically maintaining uniform dye liquor temperature, *regardless of wide variations in steam pressure in the header.*

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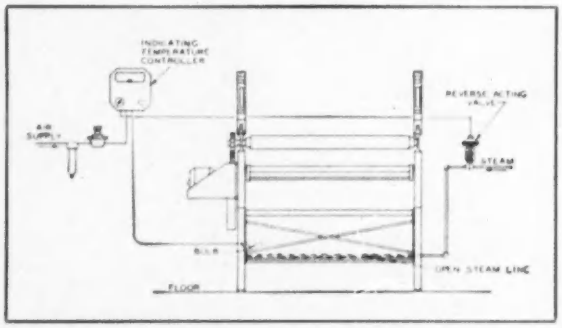

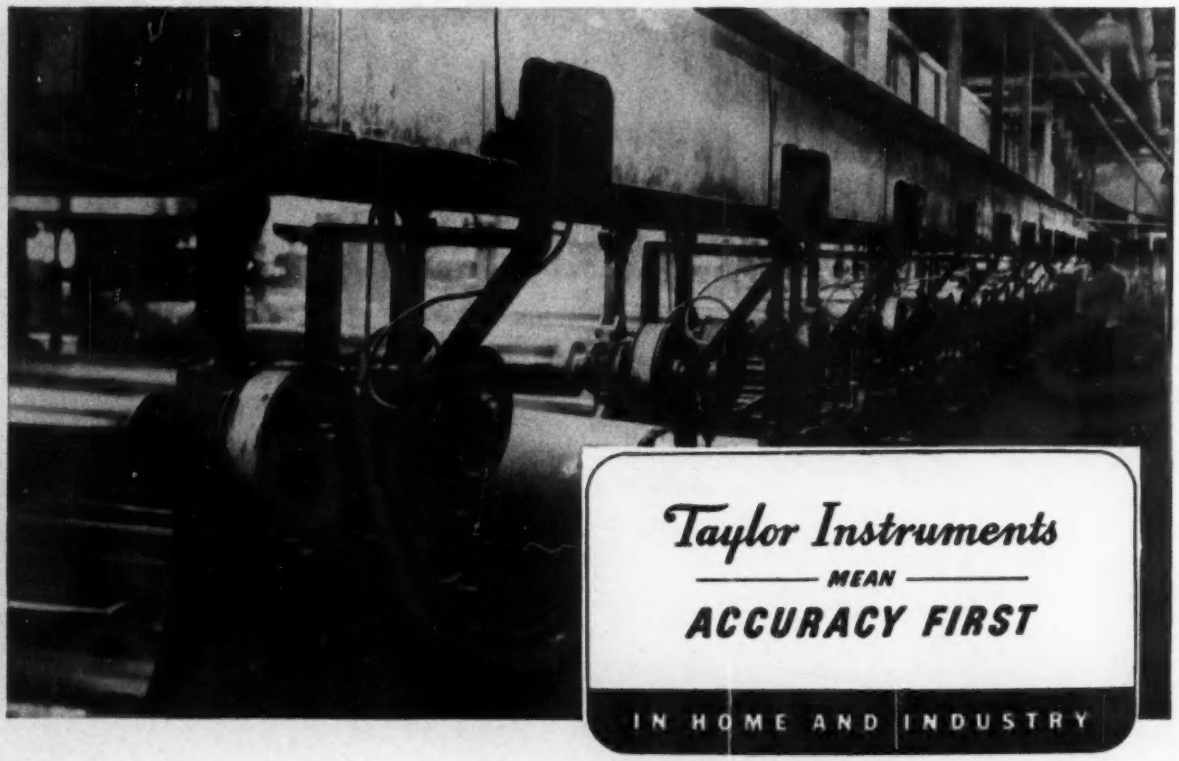

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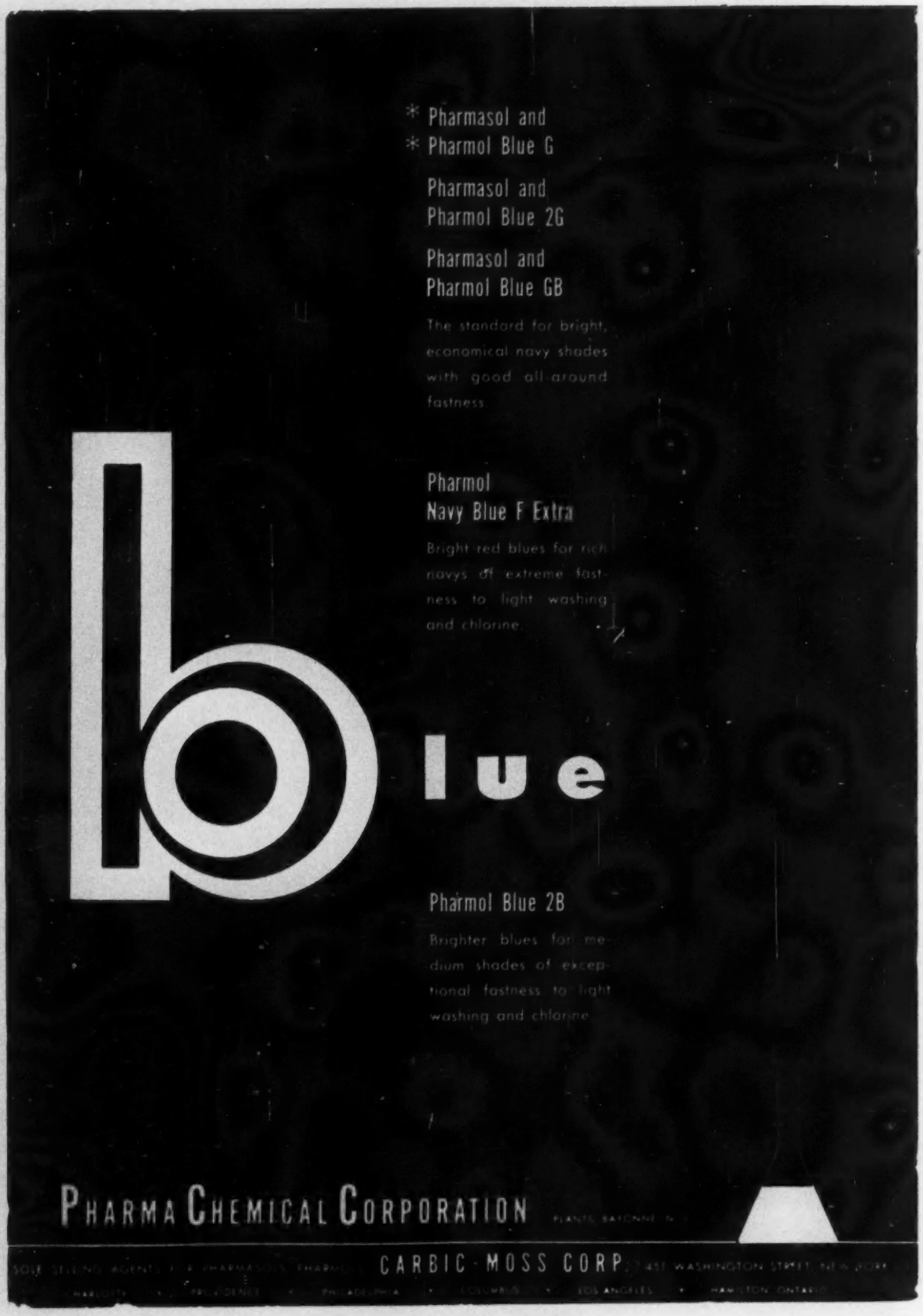
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AMERICAN

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AATCC Research Newsletter No. 20

NEWS IN GENERAL

Coincident with the 25th annual meeting of Textile Research Institute recently in New York, ECR held a special afternoon meeting March 10 and a breakfast meeting March 11. The Committee reports further progress has been made in detailing ways and means of collecting and coordinating end-use performance data, so that future AATCC tests can be relied upon to reflect end-use experience. Special guests at these meetings were: Dr Stephen Kennedy, U S Army Quartermaster Corps, for discussions concerning cooperation with AATCC on end-use studies; and Sidney Cone and Hobart Souther, of Cone Mills, with reference to work clothing problems. A special committee will be set up shortly to accumulate, coordinate and disseminate pertinent end-use study information, in connection with these and other developments.

ECR agreed to proceed with laundry tests on work clothes, and will shortly make arrangements for mild, medium and harsh washing of both work clothes and fabrics. Tests will concern both color and fabric, to assure proper correlation with actual laundering performance.

Final preparations are underway for scheduled tests next month on textiles exposed to atomic heat and radiation. Members of the AATCC team are Jim Fynn, Charlie Dorn, Harold Stiegler and Kay Jacoby, and they are all eager to be on their way to Nevada. Hopes are high that these tests will provide much valuable information for the whole textile industry on the performance of today's fabrics under atomic attack. Results—after government clearance, of course—will be widely publicized. It is planned to have a detailed report presented at the AATCC Convention in Atlantic City this September.

AT RESEARCH HEADQUARTERS:

We were all pleased to learn that Edwin P Johnstone, Technical Director of the AATCC Laboratories, is recuperating nicely after a recent illness. . . . Mrs. Lake, technician from the William Carter Co, Needham Heights, Mass, visited AATCC labs recently to receive assistance in the technical aspects of operating the AATCC Accelerotor. . . . National headquarters has begun a plan of circulating to section chairmen and secretaries a list of subjects and speakers of the various other sections. The plan has received favorable comment and can be made more detailed if all sections report meeting subjects and guest speakers' names to National Headquarters. . . . Dr Chapin reports that the Association's seal has been officially registered with the U S Patent Office. . . . The importance of the effects of tumble drying on the dimensional stability of cotton fabrics will be the subject of inter-laboratory investigation under the direction of John F Warner, vice-president of D B Fuller Co, Inc. The necessary lengths of seven cotton fabrics of commercial construction have been supplied and are now at headquarters in Lowell. Preparations are being made for inter-laboratory work to begin at an early date. . . . Ernest B Whitworth, chief chemist for the Arkansas Co, visited headquarters recently and spent considerable time with Research Director Steigler and Research Associate George Mandikos, discussing water resistance of textiles and the Dynamic Absorption Test.

COMMITTEE NEWS:

TCR Chairman Charlie Dorn reports that E Wallace Birdsall has replaced Hans Luttringhaus as chairman of the Committee on Resistance to Insect Pests. . . . The International Standards Organization tests now listed in the AATCC Year Book as "Temporary Tests" will be listed in the 1955 edition as "British Tests," "German Tests," etc., to give a clear differentiation from the AATCC tests. Dr George M Gantz has been elected chairman of the Committee on Bleaching, replacing Thomas E Bell, whose three-year term of office has expired. . . . Emil Hansen and A Morris Campbell have been named members of the Committee on Water Resistance of Fabrics. C O Werner has been appointed to the Committee on Flammability of Consumer Textiles. . . . TCR requests all its members to make a special point of signing the attendance sheet at meetings, so that an accurate record of attendance can be maintained and published.

AATCC CALENDAR

(A general calendar of events may be found on page 230)

COUNCIL
Apr 29 (Hotel Dennis, Atlantic City, N J); June 17; Wednesday evening, Sept. 21 (Chalfonte-Haddon Hall, Atlantic City, N J); Nov 18; Jan 20, 1956; Apr 20, 1956; June 15, 1956.

NATIONAL CONVENTIONS
Sept 22-24, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J); 1956 (Waldorf-Astoria, New York); 1957 (Boston); 1958 (Chicago); 1959 (Washington, DC—tentative).

HUDSON-MOHAWK SECTION
Apr 15 (Jack's Restaurant, Albany, N Y); May 20 (Ladies Night); June 24 (Annual Outing).

MID-WEST SECTION
Apr 16 (Netherlands Plaza, Cincinnati, O); June 11 (Annual Outing—Lake Lawn Lodge, Delavan, Wis).

NIAGARA FRONTIER SECTION
April 22 (Buffalo); June 24 (Outing).

NEW YORK SECTION
April 22, May 20 (Kohler's Swiss Chalet, Rochelle Park, N J); June 17 (Outing—North Jersey Country Club, Wayne, N J).

NORTHERN NEW ENGLAND SECTION
Apr 22; June 10 (Annual Outing); Oct 14; Dec 9.

PACIFIC SOUTHWEST SECTION
Apr 29, June 3, Oct 7, Feb 6 (Gourmet Restaurant, Beverly Hills, Calif); Dec 2.

PHILADELPHIA SECTION
Apr 15 (Kugler's Restaurant, Philadelphia); May 20 (Outing———Manufacturer's Golf & Country Club, Oreland, Pa); Oct 21 (Penn-Sherwood Hotel); Dec 2. Jan 13 (Kugler's Restaurant).

PIEDMONT SECTION
Apr 30 (Robert E Lee Hotel, Winston-Salem, N C); June 10-11 (Mayview Manor, Blowing Rock, N C); Oct 29 (Hotel Wm R Barringer, Charlotte, N C).

SOUTH CENTRAL SECTION
May 14 (Hotel Patten, Chattanooga, Tenn); July 29-30 (Lookout Mtn Hotel, Chattanooga, Tenn — pending); Dec 10 (Hotel Patten, Chattanooga, Tenn).

SOUTHEASTERN SECTION
Apr 23 (American Legion Club, Lindale, Ga); June 3-4 (Annual Outing, Radium Springs, Ga); Sept 10 (Ralston Hotel, Columbus, Ga); Dec 3 (Atlanta Biltmore, Atlanta, Ga).

WASHINGTON SECTION
May 20.

WESTERN NEW ENGLAND SECTION
May 13 (Ladies Night); June 17 (Annual Outing); Sept 16 (Rapp's); Nov 4 (Hartford, Conn); Dec 16 (Rapp's).

EMPLOYMENT REGISTER

55-7

Education: SM, polymer chemistry, specializing on fibers.

Experience: research and development, industrial and presently in US Army.

Age: 27; single; references; position as development or research chemist desired, available in May; any location.

3-14, 3-28

ACTIVITIES OF THE LOCAL SECTIONS

MID-WEST—The Winter Meeting of the Mid-West Section was held on February 12th at the Bismarck Hotel, Chicago, Ill.

The afternoon session attracted 54 members and guests with a featured talk by Ernest L Caswell, Ciba Co, Inc, on "Notes on Package Dyeing." Mr. Caswell also presented a sound film in color, illustrating the production of Cibalan colors in Switzerland.

During the regular business meeting Chairman Arthur I Hultberg announced the following committee appointments: *Stream Pollution* — C Fred Gurnham, *chairman*, F Harry Proudfoot, and Clarence W Wille; *Publicity* — Jack G Kelley; *Outing* — William Boyd, Jr, *chairman; Corporate Membership* — John L Eich.

At the evening session, which attracted 85 members and guests, Ray A Clark, E I du Pont de Nemours & Co, Inc, spoke on "Commercial Uses and Dyeing of Orlon Acrylic Fibers."

(Photos taken at this meeting appear on page P227)

* * * * *

PACIFIC SOUTHWEST—A quarterly meeting of the Pacific Southwest Section, attended by forty-two members and guests, was held at the Gourmet Restaurant in Beverly Hills, Calif, on Friday, February 11, 1955. The following were reported elected by letter ballot to offices for the year 1955: John Smith, *chairman;* Robert A Fliegel, *vice chairman;* Clarice H Lindsey, *secretary;* Sidney Springer, *councilor.*

The speakers were Russell B Coleman, National Dyeing and Finishing Corp, on "The Present and Future Possibilities in Cotton Piece Goods on the West Coast"; Louis Szabo, California Hand Prints, on "Screen Printing in Southern California"; and Robert Mishell, Dyemasters, Inc, on "Recent Trends in Yarn Processing." An invitation was received from the University of California at Los Angeles to a seminar on February 15, at which H E Schroeder of E I duPont de Nemours and Co, Inc, was to speak on "The Dyeing of New Synthetic Fibers, Such as Orlon and Dacron."

The next meeting of the Section will be held at the Gourmet Restaurant on April 29th, at which time J Robert Bonnar, General Dyestuff Co, will be the featured speaker.

* * * * *

PHILADELPHIA—At the March 4th meeting of the Philadelphia Section, which was held at the Penn-Sherwood Hotel, W W Harris, Jr, technical service representative for the International Salt Company, spoke on "The Role of Salt in Textile Processing. Mr Harris covered the various available types and grades of salt, types of dissolvers and their relative advantages, new developments such as TMA-5, and the latest methods in brine purification.

The next meeting of the Section will be at Kugler's Restaurant, Philadelphia, on April 15th.

* * * * *

SOUTH CENTRAL—The South Central Section held its winter meeting at the Hotel Patten, Chattanooga, Tenn, on February 26th with 75 members and guests present.

The speaker for the technical session was Dr H P Landrel, E I du Pont de Nemours & Co, Inc, who discussed "Recent Developments in the Dyeing of Snythetic Fibers."

At the banquet session Gen Clayton L Bissell (retired) presented an enlightening talk on "India and Pakistan."

* * * * *

SOUTHEASTERN—The Southeastern Section's first meeting of 1955 attracted approximately 110 members and guests to Talladega, Ala, on February 12th.

The technical session, held in the Alabama Power Company Auditorium, featured talks by William W Harris, International Salt Co, Inc, on "The Use of Salt in Textile Dyeing"; W H Hindle, Chemstrand Corp, on "The Application of Vat Dyes to 100% Acrilan"; and E D Smith, Chemstrand Corp, on "Application of Vat Dyes to Acrilan and Rayon Blended Yarns". Chairman Howard McCamy introduced Mr Harris; Secretary John C Cook introduced Dr Walter C Carter of Chemstrand, who in turn introduced Mr Hindle and Dr Smith.

During the business session, William B Griffin reported as councilor for the Section.

A dinner at the Purefoy Hotel concluded the affair.

* * * * *

WASHINGTON—The Arrangements Committee for the Washington Section, at the suggestion of the Program Committee, has contacted the Section's membership by mail to determine whether a social meeting is desired for the last meeting of the year, and, if so, what kind. Various suggestions have been offered by William

(Concluded on Page P215)

Pacific Northwest Section——

WOOL PROCESSING HERE AND ABROAD*

F G STEINER

Ciba Co, Inc

New York, N Y

INTRODUCTION

THIS paper is planned to present a few observations made by the author on different visits to Continental, British, and American textile plants. The objectives are to compare briefly some of the wool-processing practices in Europe with those in America, to discuss the development of dyeing methods and dyes for wool, and to compare the use of synthetic fibers for blending with wool as viewed by the markets of the two continents. The use of specific information is intended to support the development of certain ideas, which do not presume to cover all angles of the general subject.

Turning back the pages of history to the time of the Middle Ages, we find cloth making a handicraft that seems to have been concentrated in well-defined areas of the European continent. These areas were naturally located in sheep-raising districts, but also, to the close observer, these were regions where water was abundant for turning wheels and where this water was usually of a soft, lime-free nature. It is interesting to see that even centuries ago a supply of suitable water was recognized as of vital importance for wool processing and, it is thought, was responsible for the selection of many sites of large European textile centers. Typical examples of this fact are Bradford in Yorkshire, England, and Verviers in Belgium. In such places huge woolen industries developed because of the specific water supply. One may presume that in America locations for woolen textile mills were originally chosen for similar reasons. However, with the industrial evolution of this country other factors became predominant for the choice, such as labor, transportation, and power supply. In fact, modern water-treating equipment reduces the importance of the natural quality of the water.

WOOL-PROCESSING PRACTICES

In England a great deal of wool scouring is done with soap and soda ash. This method is claimed to leave the wool, after scouring, in a better condition than when synthetic detergents are used. It extracts less of the natural fat and grease content of the fiber. Another advantage of using soap lies in the fact that if wool fat is recovered from the baths of the scouring train, it can easily be done by cracking with sulfuric acid. By this operation the natural sheep fats are partly hydrolyzed and with soap can readily be separated from the aqueous phase as solid matter. At this stage lanolin, cholesterin, and other steroids can be extracted for subsequent refinement. With a synthetic detergent, however, the wool fat is emulsified, and the relatively simple recovery technique becomes more involved.

It should be noted that in British woolen centers scouring is usually done by only a few special mills, with less emphasis there on the type of vertical or integrated mill, which is popular in continental Europe and in America. This means that in England each operation or series thereof in the processing of wool is done by a highly specialized firm working on a commission basis. Taking a worsted fabric as an example, the wool may be processed in as many as six different mills within an area of 50 miles or so. Beginning with bales, the wool goes to sorting, scouring, carding, and combing. In another place it is top-dyed, perhaps it is recombed and blended at a third plant, and then shifted to the spinner. Beaming and weaving again are done at new plants, followed by finishing elsewhere.

The goods in their manufacturing stages are thus shifted from one mill to another, each time passing along to the next processing firm. With the good grade of Australian wool and the humid, cold climate, the wool as a lively fiber has a chance to recover after each operation it goes through and in this way regain its natural resilience and strength. There is no doubt that these factors are largely responsible for the generally accepted high quality of British goods.

There is still another factor to be considered, which I like to call *tradition*. How this influences the end product cannot be measured with exactness nor reliably estimated. However, it is impressive to see the ability of some older wool experts, whose grandfathers and fathers have done the same evaluation of wool stock, deciding whether a particular lot will be best for the warp or filling of a certain fabric and what count and twist will provide the utmost performance.

Economically the English industrial structure, specializing in a given processing stage for various textiles, is less vulnerable for the individual firm than is the integrated type of business as found in Europe and America. Where a series of departments as a unit manufactures a specific type of fabric, every move in the apparel market and change in fashion may influence production in terms of profit or loss.

Technically speaking, however, the integrated system permits effective planning and adaptability to changes. This reflects the more flexible and less conservative market of the United States. The American manufacturer is able to deliver goods

In this paper the author not only points out differences in the organization and practices of wool processing here and abroad, but he uses the opportunity to discuss instructively certain phases of wool dyeing. The application of dyes to wool under pressure with circulation of liquor at not over 225°F in such a way as to minimize damage is claimed to produce better dyeings in a shorter time. A suggestion is offered for simple method to calculate the amount of sulfuric acid for acid-dyeing metalized dyes on wool so as to avoid the great excess usually recommended. The advantages of the relatively newer neutral-dyeing metalized dyes are also pointed out. Although Europeans have perhaps a greater respect for all-wool fabrics than do Americans, it is reported that blends of wool with the newer fibers are likewise making rapid progress there.

* Presented at the Multnomah Hotel in Portland, Ore, on Nov 12, 1954.

on short notice. Therefore, considerable dyeing is done here in the later stages of processing in order to supply the customer's needs quickly.

Most worsted yarns in England are dyed in top or slubbing form, whereas generally continental and American firms prefer yarn dyeing in skein form or, in order to prevent felting and to reduce winding costs, package dyeing has been adopted. All of us recognize that top dyeing provides a more regular, more evenly colored result than cake dyeing of the same type yarn. However, we can agree that yarn dyeing offers greater flexibility and market responsiveness.

DYEING METHODS

CIRCULATION OF DYE LIQUOR ———The practice of circulating dye liquor through the material rather than running the goods through the liquor, except in the case of piece dyeing, offers its advantages. In Europe the Hussong machine in its different modifications and refinements is becoming very popular for this purpose. In package-dyeing wool, the general consensus is that the amount of liquor circulated through the goods is more important than high flow pressure, this being the reverse of cotton dyeing, where high pressure is required. Wool, by its chemical nature and its rather loose density, needs low pressure, otherwise felting results. Thus, one finds many low-pressure machines being built today, preferably not with a pump but with a propeller drive. For these reasons practically all the Klauder-Weldon machines with movement of the skeins are going out in Europe because of their many disadvantages as compared with the Hussong machine. The latter has become a standard for dyeing coarser yarns, ie, carpet and knitting yarns.

In the Hussong machine the hanks are suspended from sticks, which usually show a V or H cross section in order to prevent stick marks. They remain stationary while the dye liquor is circulated through the wool by means of a reversible propeller.

On the European continent particularly, a modified Hussong-type machine has come into wide use for the dyeing of finer-count weaving and hosiery yarns. The skeins are held both at the top and at the bottom by sticks in order to keep them in straight positions and to prevent tangling. This is especially important when the direction of flow is upward and the hanks tend to be lifted by the pressure of the liquor. Channeling is also prevented. Another advantage is that the stainless-steel sidewalls prevent the hanks being trapped.

PRESSURE DYEING———On the Continent a new trend in dyeing methods has been developed in the last four or five years. This concerns dyeing wool at temperatures above the boil. In this connection, we understand that probably the first practical runs were made after World War II in a Belgian commission dyehouse. The procedure developed there was called "The Steverlynck-static Process". As reported in the literature, the original purpose of dyeing under high temperature or static pressure, in contrast to the dynamic pressure of pumps or propellers, was to get better ways of dyeing rayon cheeses. The advantages of this method soon were recognized, and it was applied in dyeing other synthetic and natural fibers. What then are the advantages of dyeing under static pressure above 212°F in a completely enclosed circuit?

It is well known that, in an enclosed machine as for package dyeing, the pump's capacity drops greatly at 205-210°F. In order to maintain a certain flow near the boil, dyeing machines usually are equipped with over-powerful pumps. But, if the liquor flow is fully enclosed, the pressure above the liquor builds up, with the boiling point raising proportionally. Because the evaporation point then lies above 212°F, at any given temperature the pump works at a much higher rate than without pressure. This has the advantage that with the same pump better performance can be obtained.

From the tinctorial point of view it may be said that the main advantages of pressure dyeing are better dye leveling and fiber penetration, and with this improved crocking fastness. Within three-fourths of an hour, counting from beginning of dyeing at 120°F to the ending, ie, raising the temperature in a half hour, keeping it 15 minutes at 220°F, completely uniform results can be obtained with dyestuffs which, in normal dyeing equipment, show a low leveling index and cannot be applied successfully. All types of milling colors and the newer premetalized neutral-dyeing wool colors, such as the Cibalans, have been applied very successfully in only 15 minutes in package-dyeing yarn at 218°F. Modern pressure machines allow us to make additions of color to get on shade within 10-15 minutes without releasing the pressure. At these high temperatures the wool fiber tends to become plasticized and to swell. The intermicellular spaces between the macro molecules grow, enabling easier diffusion of all types of color into the fiber. The high temperature also favors the breakdown of dyestuff aggregates into single molecules, further promoting penetration.

HIGH TEMPERATURE AND WOOL ———From research work carried out in the laboratories of Ciba Limited—and confirmed basically from other sources—it is evident that in wool dyeing a temperature of 225°F should not be passed. Analytical examination of fibers dyed at different temperatures above the boil proves that degradation is a direct consequence of too high temperature and results from the length of the dyeing cycle and the acidity of the bath as well. In order to prevent any fiber damage 30-45 minutes at 225°F should never be exceeded.

All available wool dyes have been tested in dyeing under pressure. Most of them have been found stable except those few which are degraded by prolonged boiling under normal temperature.

In most continental countries, especially Belgium, France, Germany, and Switzerland, we now find equipment for pressure-dyeing wool; and most progressive machine makers today are able to supply such equipment primarily for package dyeing. In general in the United States these machines find their application in pressure-dyeing synthetic fibers, mainly Dacron, which under these conditions is dyed without a carrier. In the last few years great strides have been made in developing such machines.

NEW SWEDISH METHOD———Recently a Swedish firm began marketing a machine to be used for semicontinuous piece dyeing. The "Pad-Roll system", as the machine is called by the manufacturers, has been used for dyeing cotton and rayon, but so far only pilot runs have been made with wool pieces. The machine consists basically of a padder, which is immediately followed by a heating zone and a fully enclosed steam chamber. The fabric after impregnation with dyestuff and chemicals is warmed up to temperatures near the boil by exposing the goods on both sides to infrared radiators. The cloth then enters the steam chamber, where it is rolled up in open width on a beam with a minimum of tension. The atmosphere in this chamber is kept moisture-saturated in order to perform the dyeing process while the beam is rotating.

DEVELOPMENT OF NEW WOOL DYES

NEUTRAL-DYEING METALIZED DYES———Hand in hand with progress in wool processing have come improvements in wool dyestuffs. The greatest advance of this kind in the last few years was marked by the introduction of the premetalized neutral-dyeing wool colors, such as the Capracyls, Irgalans, Lanasyns,

Supralans, and Cibalans. Those who are connected with wool dyeing particularly should appreciate some data to illustrate why these dyestuffs represent such a considerable advance in dyeing wool and nylon.

The application of a mordant for fixing dyes on wool is nearly as old a practice as the making of fabric itself. Most of us know the importance which the modern mordant colors or chrome dyes have gained since their appearance on the market, despite their rather complicated application method. We understand too well how difficult the shading problem is, and how sensitive are these dyes to traces of metals present in the dyebath, to pH variations, and to hard water. It is well to bear in mind that in the dyeing process hexavalent chrome in the dyebath has to be reduced to the trivalent stage to form a complex with the dyestuff, this being done under partial oxidation of the Keratin, impairing the quality and hand of the wool.

A certain advancement was had with the introduction of neutral-dyeing metalizable colors known as metachromes, for these had the advantage of being applicable together with a chrome mordant by a one-bath method. But here again the disadvantages of metalizing, ie, chroming the fiber, were still present, and the problem of shading remained difficult and uncertain.

ACID-DYEING METALIZED DYES ———In the year 1919 a new type of dye was brought to the market, that is, the Neolans by Ciba Company; and at nearly the same time the Palatine Fast dyestuffs were introduced by the late BASF, marketed in this country by General Dyestuff Corp. Both groups of dyes are known as premetalized, acid-dyeing wool colors. Chemically they are all chrome complexes of metalizable azo molecules containing one atom of chrome with one molecule of a suitable azo compound. Their perfect leveling properties and reasonably good wet and light fastness made these colors very popular, particularly among yarn and piece-goods dyers. Their ease of application and the nice soft hand imparted by the dyeing acid on worsted pieces helped a lot to broaden their application field.

Here we may note that the amount of sulfuric acid used in Neolan dyeing was the subject of a research program completed only about two years ago. It was established that the needed weight of sulfuric acid is not only a function of the poundage of wool to be dyed, but that this amount also depends upon liquor ratio. Wool itself under the conditions of Neolan dyeing absorbs and binds chemically, after a short period of boiling, roughly 4% sulfuric acid conc, calculated on weight of fiber. To promote migration and thus leveling, an additional amount of acid is required. This additional acid can be calculated for light shades as 0.7 g/l and for medium and heavy shades as 1 g/l. These figures enable the dyer to calculate the right amount of sulfuric acid to be used under specific conditions or, in other words, to dye at the correct pH level.

The conc sulfuric acid, 66°Bé, needed for a medium-depth dyeing is then 4% owf + 1g/l, or 4% owf + 0.83 lb/100 gal. The pH should be 1.9—2.1.

In order to show the importance of a correct acid concentration in relation to liquor ratio, let us assume that we are dyeing in a package machine with a 1:12 volume. The amount of acid used under these conditions would be 5.2% owf calculated from the above formula. If now the conventional 8% acid should be used, then there would be about three to four times as much free acid as needed in the bath, and this excess acid would likely lower the quality of the wool yarn.

A residual alkali content of the wool is not considered in the above calculations. This formula applies only to a well-scoured wool. If the wool contains soda ash or other alkali, then the above figures will have to be corrected accordingly.

Referring again to research on Neolan dyes, it is interesting to note that as far back as 1925 and 1928 Ciba patented some predecessors of the neutral-dyeing premetalized colors. In these patents water-soluble, metal-complex dyestuffs of a nonsulfonic-group nature were described, but these dyes could not be applied along with Neolan dyestuffs. This result is understandable, because these complexes of one metal and two azo molecules are not stable in a sulfuric-Neolan bath and thus cause unlevel dyeing. Already at that time it was noticed that the colors could be dyed from a neutral bath on wool and silk, but these particular dyes were abandoned because their shades were not interesting and their fastness was not especially good.

APPLICATION DETAILS FOR CIBALANS———However, in the last decade great emphasis has been put on the research of one-bath chrome dyestuffs. The final aim has been to avoid the addition of metal salts to the bath and to build finished water-soluble metal complexes providing greatest fastness without affecting wool quality. The achievements of this effort can be seen in the wide range of Cibalan dyes now available to the dyer.

Chemically the Cibalans are water-soluble, metal-containing colors without sulfonic acid groups, but with other solubilizing radicals. Dyes of this general type can be made in various ways by incorporating different solubilizing groups, which groups are not only responsible for the solubility but also for the linking of the dyestuff to the wool fiber. Such groups are usually characteristic of the manufacturer. Regarding the metal content of the Cibalan colors, these dyes may be compared with the metalized chrome colors on the fiber. They contain an average of two molecules of an azo compound with one atom of metal.

The dyeing qualities of these colors on wool or nylon derive from the fact that their rates of exhaustion are dependent upon temperature and the pH of the liquor, and they possess relatively little migration properties in the boiling bath. But below the boiling point, as long as the dyestuff is not properly fixed, migration properties can be compared with those of the best-leveling acid colors. For complete fixation approximately 20 minutes is needed in the boiling neutral or slightly acid bath. At a lower pH, exhaustion and linkage to the wool occurs much faster, within minutes or even less.

It has been observed that an addition of Glauber's salt does not help the leveling properties of the Cibalan dyestuffs. In fact, the contrary is true. Glauber's salt or common salt speeds up the rate of exhaustion and therefore acts unfavorably. On the other hand, it can be easily shown that the addition of nonionic auxiliaries of the type showing affinity for dyestuffs slows down the rate of exhaustion and increases migration or dye transfer.

The light fastness of these dyeings is excellent throughout the whole color range, even in very light pastel shades. This is why the use of these colors has spread so rapidly for the dyeing of light greys, beige, and camel shades on wool stock, tops, yarn, and piece goods. Fulling fastness is so good that often these dyes can easily be substituted for chrome colors when subject to later severe fulling. A particular feature of the neutral-dyeing wool colors from a tinctorial point of view is their limited brightness, which is characteristic of most mordanted dyestuffs. However, because of further research, bright colors are in prospect and these soon should be available.

BLENDING WITH WOOL IN EUROPE

From this excursion into the field of newly developed dyestuffs let us return to the original subject and compare the average outlook of the European buying public with the American consumer's attitude towards wool and its blends.

The European consumer, and the Canadian too, is usually more wool-minded

than the average person in America, as evidenced by considerable newspaper and magazine advertising. On the continent, and even moreso in Britain, wool is considered as nature's miracle fiber with no substitute of equal value. People have gained this attitude from their experience through centuries, making them very wool conscious. Specific properties of wool, for example, felting and shrinking in washing, have been taken for granted.

With respect to blends, viscose rayon has for some time been the most important fiber for blending with wool. However, in Europe its use in wool blends has always been considered as "Ersatz". The English term is roughly "substitute" or "equivalent", but these words as a matter of fact do not reflect the true meaning, which in the public mind implies that the substitute is of lower grade or second class.

This feeling toward blends was gradually built up during World War II when many European countries were cut off from their traditional overseas supply markets. Wool then became very scarce and, in order to make stocks last longer, the manufacturer had to blend by governmental rule at least 30% rayon with wool. All this compulsory substitution did not improve the quality of the fabric nor its wearability. Inferior fabrics with poor constructions and substandard dyeing and finishing were placed on the market and caused justifiable complaints. Towards the end of the war even 50/50 and 30/70 blends of wool and rayon were widely sold on the Continent, although these blends were never really liked.

A few years back in Europe 85/15 or 75/25 mixtures of wool and nylon were brought to the market, and these were well accepted after some original deficiencies of poor fiber engineering were overcome.

CONCLUSION

For the American consumer, the magic word wool appears to be not so deeply anchored in his mind, and he is much more inclined to accept the promotions of blends with new fibers. There is little doubt that national advertising has greatly increased the acceptance of new fibers and blends in this country. On the other hand, wool-apparel manufacturers have been slow to acclaim the sheep's contribution to the fiber family in comparison with claims for synthetics. Recently, however, the merits of wool were brought back to public attention through national and individual advertising by display signs in men's clothing stores reading, "All-wool worsted suits are back again".

Today European textile manufacturers are approaching plenty of new developments in the field of synthetic fibers too. In addition to nylon, polyacrylics have begun coming strongly into the wool field. But this is different from America, for there are already 4 different types of Orlon, namely: PAN, Redon, Dolan, and Crylon, each one with slightly different properties. If the predicted properties of the different test-tube fibers really fulfill the claims made for them, then Europe may reach a situation similar to the one that is developing here in the United States. But it is still a question whether the European public will accept all the different wool-synthetic blends as readily as they have been adopted in America.

Activities of the Local Section——

(Concluded from Page P211)

M Segall of the Arrangements Committee, including a boat trip down the Potomac, a picnic, golf, fishing, dancing, ice skating and hiking.

* * * * *

WESTERN NEW ENGLAND—James B Mumma, Carbide & Carbon Chemicals Co, addressed the Western New England Section at its March 18th meeting at Rapp's Restaurant, Shelton, Conn. Mr. Mumma's topic was "Theory and Practice in the Use of Synthetic Textile Lubricants."

* * * * *

The panel at the New York Section's recent symposium on dyeing and finishing problems consisted of: (Seated, l to r)—John A Komninos, Waldrich Co, Paul J Choquette, General Dyestuff Co, and Harry Moore, Fair Lawn Finishing Co; (Standing, l to r)— James H Murray, Consolidated Bleaching Co, Donald E Marnon, American Aniline Products, Inc, and Fred Fordemwalt, American Cyanamid Co. (See meeting report on page P161 of previous issue.)

MEMBERSHIP APPLICATIONS

MARCH 11, 1955

SENIOR

Alois C Baggenstoss — Chemist, Gaston Chemical Inc, Gastonia, N C. PIED. Sponsors: R E Weber, Jr, J. Wotten.

Harold L Brewer—Supt of dyeing, Pilot Mills Co, Raleigh, N C PIED. Sponsors: C C Cayce, W G Green.

Charles D Curtis — Dyer, Consolidated Textile Co, Inc, Taunton, Mass. RL Sponsors: R E Watson, V Snowden.

Leonard Goodman — Dyer, United Yarn Co, Chicago, Ill. MW. Sponsors: R B Lueg, E W Camp.

James N Grouney — Textile chemist, American Cyanamid Co, Bound Brook, N J. NY. Sponsors: A L Logan, P B Roth.

Veeriah Kota — Lecturer in chemistry, Osmania Univ, Hyderabad, India. Sponsors: R J Peirent, H E Glidden.

Robert J Lincoln — Research chemist, Chemstrand Corp, Decatur, Ala. SE. Sponsors: E D Smith, W C Carter.

William G McGuigan — Overseer-raw stock dyeing & blending Bigelow Sanford Carpet Co, Inc, Amsterdam, N Y. HM. Sponsors: W O Tarbert, W C Forstall.

(Concluded on Page P228)

Western New England Section——

WASHABLE RAYONS*

I H WELCH, JR

American Viscose Corp

Marcus Hook, Pa

INTRODUCTION

THE process and development of durable finishes for making rayons washable has been the subject of a great many papers presented before the AATCC and published in the *American Dyestuff Reporter.* It is not my purpose this evening to review these papers or to present an historical background on the subject of washable rayons. I prefer rather to discuss the Avcoset fabric process and its merits and to explain its application in some detail.

The Avcoset fabric process has been available to the trade for the past four years. However, the original formulation which employed the alkali-soluble type, Avcoset C, and had sulfuric acid as its catalyst was not readily acceptable because of the complex mixing procedure and the great care that had to be exercised in preparation of the formula. The early process also had very definite limitations in producing a range of hands. The American Viscose Corporation through its research and development program at its Textile Research Department improved its original Avcoset formula. The Avcoset C was replaced by Avcoset WS, a water-soluble cellulose ether, which made possible the changing of the catalyst from sulfuric acid to sodium bisulfate and sodium sulfate. The change to a water-soluble cellulose ether also made it possible to add various other chemicals to alter the hand so that finishers are now able to offer quite a range of hands.

AVCOSET RAYON FINISH

BASE FORMULA———The base Avcoset formula for shrinkage control is as follows:

5.0% Avcoset WS
10.0% formaldehyde, 37% soln
2.0% sodium bisulfate
.5% sodium sulfate, anhydrous

This formulation, when properly applied to a fabric, will produce a finished fabric that is stabilized within 2.0%. Such a fabric will have a combined formaldehyde content of 0.4 to 0.7%, the moisture retention of the fabric being reduced to 50% from approximately 80%. The tensile strength usually shows from 0 to 10% reduction in strength, while the tear strength drops from 15 to 25%. The resistance to dry abrasion as tested for instance on a Stoll flex machine shows a considerable drop. The fabric definitely needs a lubricant as the formaldehyde reaction makes the fiber somewhat brittle in the dry state, although repeated washing tests prove that a large increase in resistance to wet abrasion is obtained.

The author discusses in detail the application of the Avcoset fabric process for the stabilization of rayon fabrics. The Avcoset fabric process not only denotes durable shrinkage control, but also durable hand and durable color without the danger of chlorine retention. The use of various additives to obtain a greater range in hand and the influence of these additives on other physical properties are explained. The resistance to fibrillation offered by Avcoset is contributing measurably to the increased wear life of Avcoset garments.

MODIFICATIONS———To reduce the undesirable side effects mentioned in the last paragraph the simplest approach is the inclusion of an additive in the formulation, such as Avcosol 20 of the Atlas Powder Co. Durable softening effects are obtained, but moisture retention and tensile strength remain as previously described. The tear strength holds close to the original figure, and the drop in the dry-abrasion test figure is not so great. This lubricant allows the hand to be practically identical with that of the untreated fabric. A new material known as Aquapel S-437, which is a dialkylketene dimer manufactured by the Hercules Powder Company, does an excellent job of increasing the tear strength when added to the base Avcoset formula. This increase may be as much as one hundred percent above that of the untreated fabric. It will also result in a higher flex and flat abrasion when tested on the Stoll abrasion machine. Small percentages of pyridine-containing water repellents or silicone water repellents in a concentration as low as one-quarter of one percent when added to the base Avcoset formula will also produce fabrics showing increased tear and abrasion test results.

The base Avcoset fabric formula containing any of the previously mentioned materials will produce a rather soft hand quite similar to that of a boiled-off and dyed fabric. If the finisher desires to produce a firmer hand, it is suggested that increased amounts of Avcoset WS be used. The Avcoset WS may be increased up to five times the amount in the base formula if desired. The addition of 1 to 3% of a pyridine-type water repellent along with up to 1% of polyvinyl alcohol will give increased fullness and the illusion of added bulk. A crisp hand depending upon the fabric construction may easily be obtained by increasing the concentration of Avcoset WS or by adding polyvinyl alcohol or carboxymethyl cellulose. It is to be strongly recommended, however, that, whenever a crisp hand is desired, the formulation include a small concentration of any of the previously mentioned materials used for increasing tear strength. Not only will the tear strength be improved, but the ever-possible danger of needle cutting will be minimized. Actually, full-bodied fabrics with a hand not lost in repeated washings are now often made by the use of two and three times the base Avcoset WS, one-quarter to one-half percent PVA and from one-quarter to two percent durable lubricant. If the latter is of a pyridine type, there is some increase in crease resistance, and a fuller hand is obtained than would be expected. Silicones and Aquapel S-437 have not given the same increase in fullness of hand.

DURABLE GLAZE———Employment of the principle of calendering to obtain a glaze or sheen can be incorporated into the Avcoset fabric process to produce a stabilized rayon fabric having a durable glaze. The amount of glaze obtained is dependent upon the type of calender employed. A silk-type calender at 275 to 300°F will give a light glaze or sheen, while a friction calender at 340°F will give a much higher glaze. The chemical formulations are the same as for the regular Avcoset fabrics, but processing is changed to bring the fabric off the frame slightly moist and to calender prior to the curing operation.

* Presented at Rapp's Restaurant in Shelton, Conn, on Friday, October 1, 1954.

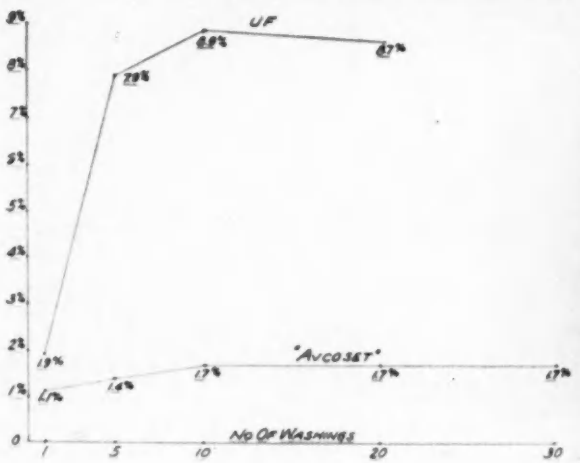

Figure 1

Spun-viscose shirting——warp shrinkage——160°F white wash without chlorine

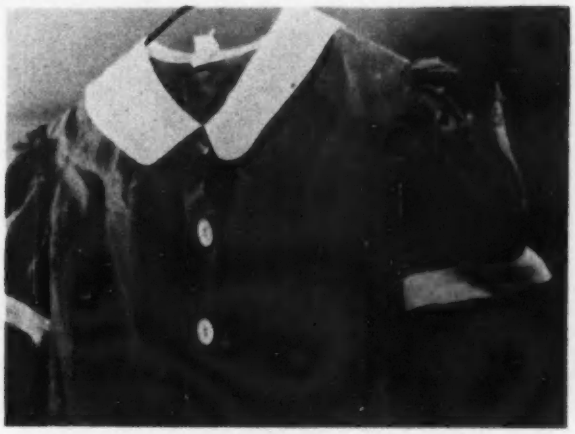

Figure 2

PROCESSING —— Mechanically the Avcoset fabric process follows a routine fundamentally the same as for many of the cured resin applications: pad, dry, cure, wash, dry and finish. As the pad liquor forms a slightly viscous mix, it is recommended that a pad box permitting a double immersion be used. A double immersion aids in obtaining an even surface saturation before actual completion of the impregnation at the nip. The pad rolls should be normal rolls of 12 to 20 inches in diameter operating at pressures to allow a pickup of approximately 75 to 85% on a normal spun-rayon challis or gabardine. It is beneficial to the ultimate dimensional control of the fabric to have some warp tension during padding of the chemicals. A stretch of 3 to 8% is to be recommended. Remember that prior to padding the fabrics have been boiled off, dyed, dried, and tentered to width and have accepted some of the expected processing shrinkage. Avcoset fabrics can be finished to show less processing loss than fabrics processed by other methods, if desired. This warp stretch is maintained during the next step of drying on a clip tenter at one-half to one inch over the desired final width. The temperature of the frame should be at 240 to 290°F. Necessary provisions must be made for adequate ventilation of the considerable formaldehyde fumes that are given off into the air at the entrance of the frame. Curing can be done on any machine that produces the required conditions of time and temperature. The matter of tension or relaxation during this phase of the operation apparently is far less important than during the drying step. Typical curing cycles are 330°F for 2½ minutes and 315°F for 5 minutes.

Some blends of viscose with either acetate or the acrylic fibers should be cured at lower temperatures. A reasonable cycle for curing such blends appears to be 300°F for 4 minutes.

After the curing cycle the fabric must be washed and neutralized. A great many plants in finishing nonwashable resin fabrics today eliminate this step. However, in the finishing of Avcoset fabrics it cannot be omitted. It is absolutely essential that the fabric be washed to provide neutralization of the chemicals remaining on the fabric, to remove excess salts, and to provide an opportunity for wet relaxation. Washing may be done in either a rope-style washer or a continuous open-width tensionless washer. Washing is carried out at 120 to 160°F at a pH of 9 in the presence of a synthetic detergent, followed by water rinsing to clear the fabric.

The final drying is always an important step, as this is the last opportunity to control the actual shrinkage desired in the initial wash test. The degree of relaxation required in this step varies with fabric construction and somewhat with the concentration of bonded additives. For example, continuous-filament lining fabrics can be partially dried on a clip tenter, run on a palmer and then calendered. With a spun-rayon challis or gabardine the drying is best accomplished in a loop or airlay dryer or on an overfeed pin tenter, and this is followed by a steam framing or semidecating to give a smooth final finish. Some of the relaxation of the original drying is lost in this latter step, but shrinkage control can still be easily maintained below 2%. It must be understood that, in finishing for stabilization, all of the operations following curing must be consistent with regard to either relaxation or tension regardless of the chemicals used. If care is not taken, then it would be best to leave shrinkage control out of the label and out of the advertising of the finished fabric. No treated textile fabric can be abused and still retain stability to the first wash. The chemical treatment takes care of the progressive shrinkage, but the relaxation finishing controls the first wash test. It is not at all difficult to do good work, but basic rules must be followed.

ADVANTAGES OF THE AVCOSET FABRIC PROCESS

There are many adventages to be gained through the use of Avcoset fabrics. First, is the excellent shrinkage control of the fabric through its normal life. For fabrics to be identified as having been treated with Avcoset, they must have less than 2% shrinkage when tested in accordance with the Cotton Wash Test Procedure of the CCC-T-191a Federal Specifications. This shrinkage control is durable and lasts throughout the life of the fabric, as shown in Figure 1.

Another advantage, and a very important one, Avcoset fabrics are not chlorine retentive. Many garments, if labeled washable, will be subjected to the action of chlorine bleach whether used at home or at a commercial laundry. If the fabric has been finished with a nitrogenous resin, chlorine will be retained through the formation of chloroamines. During pressing this chlorine will be liberated as hydrochloric acid, which causes degradation of the cellulose and a consequent loss in strength. Fabrics which have been Avcoset treated will not be affected adversely by normal bleaching. (See Figure 2 for an example of chlorine damage).

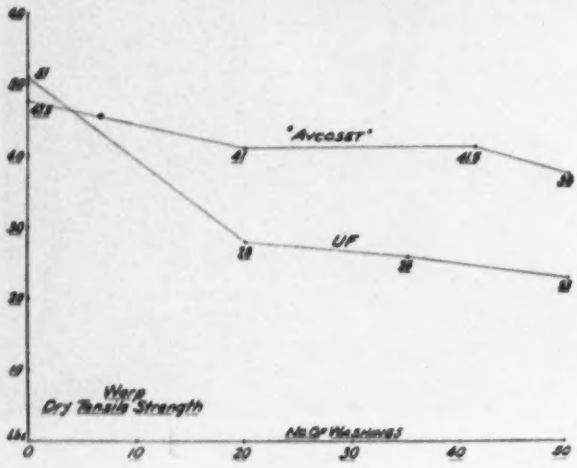

Figure 3

Spun-viscose shirting——commercial white wash without chlorine ——160°F

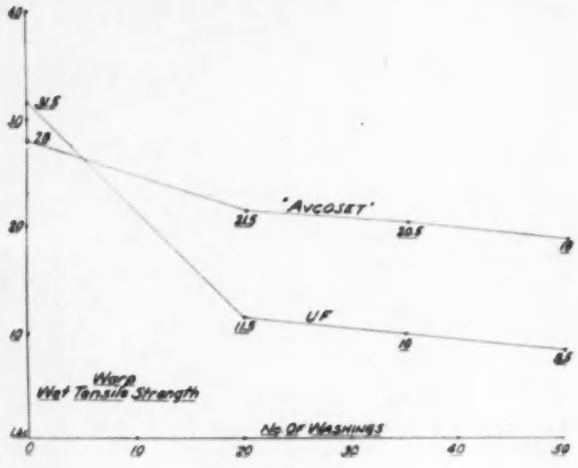

Figure 4

Spun-viscose shirting——commercial white wash without chlorine ——160°F

The tensile strength of rayon fabrics is reduced during repeated washing cycles, probably because of the abrasive action of the washing machine. Many tests have been conducted which conclusively prove that Avcoset fabrics retain a higher percentage of the initial strength both wet and dry during repeated launderings than do either untreated or resin-treated fabrics. It is assumed that this added resistance to wet abrasion occurring during the washing cycle is one of the main contributing factors to the increased wear life of Avcoset garments over regular finished or resin-finished garments.

Figure 3 depicts graphically the change in the dry tensile strength of a spun-rayon fabric during forty washing cycles. One portion of the fabric had been finished with urea-formaldehyde resin and one portion with Avcoset.

Figure 4 depicts graphically the change in the wet tensile strength of a spun-rayon challis fabric during forty washing cycles, one portion being finished with urea-formaldehyde resin and the other with Avcoset.

It can readily be seen from these figures that increased wear life would be expected from an Avcoset fabric over a resinated or unfinished fabric. However, it was apparent that more than just greater retention of tensile strength during repeated launderings was responsible for this increased wear life of Avcoset fabrics. Upon examination of the laundered samples it was quite apparent that the Avcoset fabrics retained more of their original appearance, while the resinated or untreated rayon fabrics were quite fuzzy and contained holes and abraded areas.

Photomicrographs were taken of the individual fibers from each of a number

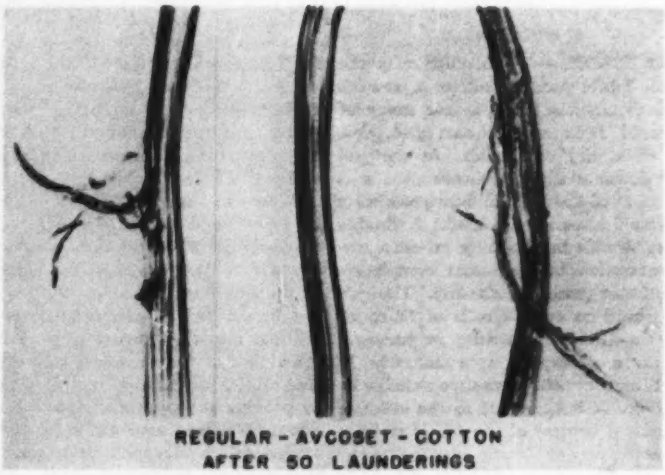

Figure 5

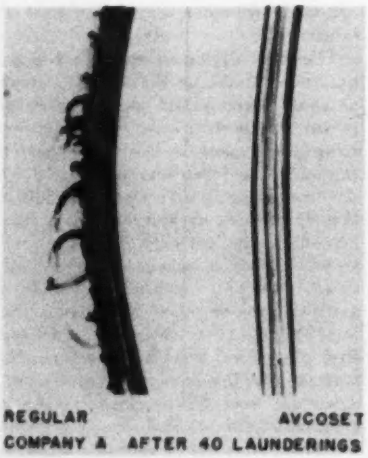

Figure 6

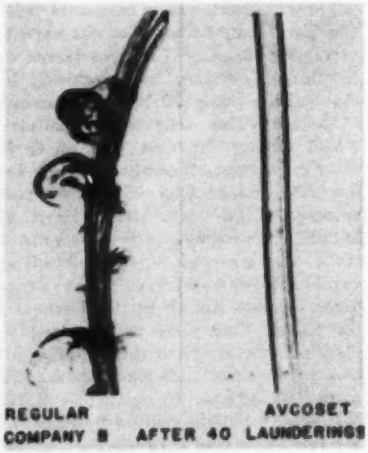

Figure 7

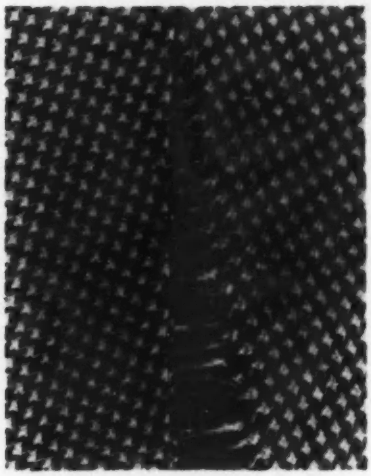

Figure 8

Figure 10

of rayon fabrics with both a regular finish and an Avcoset finish and of cotton fabrics, both before and after repeated launderings. The photomicrographs clearly depict the difference. Before laundering all the fabrics showed very smooth fiber surfaces, whereas after repeated launderings the only one to retain this original smoothness was the fiber from the Avcoset sample. The regular finished rayon and the cotton sample both showed fibrillation. Unquestionably, it is this resistance to fibrillation offered by the Avcoset which is contributing measurably to the increased wear life of Avcoset garments (see Figures 5, 6 and 7).

In connection with the wear testing of washable fabrics, seam fraying during the laundering cycle is a most important factor which could end the usefulness of a garment and yet have no connection with abrasion test figures. The effect of finish on such a condition is most important. This is illustrated in Figures 8 and 9 showing the seam of a pair of washable slacks made from a 90% rayon, 10% nylon fabric. The portion on the side of the seam showing little or no fraying is an Avcoset fabric, while the fabric which has frayed excessively is a resin-treated fabric. The fraying of edges is greatly reduced, not because of bonded fibers but rather because of the permanent set of the fibers in the yarns. This prevents the straightening out of the fibers, which would give rise to yarn slippage.

Figure 9

Durability of hand was mentioned earlier. However, Figure 10 shows pictorially the retention of hand. Both of these fabrics are rayon marquisette. The sample on the right has been finished by the Avcoset fabric process, while the sample on the left has been resin-finished. Both fabrics were washed at 120°F for 15 minutes for five successive washings and dryings and then photographed.

Last but certainly not the least that is important in washable rayons is the color. It is essential that all rayon fabrics labeled *washable* be dyed with dyestuffs that will withstand repeated launderings at 160°F even in the presence of bleaching agents and alkalis and that the color will not fade in less than 40 hours when tested in a Fade-Ometer.

Through the use of vats, naphthols, and solution-dyed rayons, a full range of shades from pastels to deep tones are available. The ultimate consumer is assured of complete color satisfaction when these dyestuffs are properly employed, and the converter and dyer are assured of repeat business when the consumer is satisfied. As washable cottons have long been dyed with the fastest dyestuffs, the consumer has every right to expect that washable rayons should offer the same high standard of quality.

Our experience to date has shown that some aftertreated directs will pass the 160°F wash test even with the addition of chlorine bleach; however, the light fastness is poor, while other aftertreated directs show good light fastness but show staining of the multifiber test cloth in laundering. Other dyes may fail because of a severe shade change in finishing. Great strides have been made during the past year in this field and undoubtedly even greater accomplishments are in the offing. However, we have not yet seen a range of shades which will meet the high standard of quality of the Avcoset fabric program. All rayon fabrics to be eligible to bear the trade-mark Avcoset must meet the colorfastness requirements for a washable fabric given in American Standards L22.

CONCLUSIONS

In closing I should like to say that a rayon garment labeled *washable* should not shrink, fade, or lose its hand, or original beauty when washed by any means the customer chooses to use, and it should retain its original usefulness for a satisfactory period of time. All of these properties are assured through the Avcoset fabric process.

ACKNOWLEDGMENTS

Gratitude is expressed to F F Morehead of the Research and Development Department of our company for the photomicrographs presented in this paper. Appreciation is also in order for all the other plates photographed by C Martin of the Textile Research Department.

Atlanta Convention
Finishing of Textiles——

ANTISTATIC ACTION VERSUS MOLECULAR STRUCTURE*

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The mechanisms of charge generation and dissipation are discussed. Chemical agents can modify the triboelectric position of a fiber directly, or they can provide transfer of agent to lessen triboelectric generation. They can also dissipate the charge by conduction. A method of calculating the amount of conductivity needed to counteract electrostatic effects on yarns and fabrics is proposed. Bulk resistivities in a series of oxyethylated nonylphenols are discussed, and data are presented showing the effect of humidity variations. The evaluation of agents on fibers by means of a conductivity method and a Neoprene-glove electrometer method is described. In choosing a chemical structure for use as an antistatic lubricant or finish on a particular fiber, it is important to avoid agents which diffuse into the fiber. Various surfactants have been evaluated, on a number of different fibers, with respect to storage. Progressive changes in effectiveness are discussed with respect to penetrability, viscosity, hygroscopicity, and molecular structure. Brief mention is made of other requirements for an antistatic agent, such as lubricity, which can be controlled by the degree of oxyethylation and by other structural considerations.

INTRODUCTION

MANY excellent articles have described the causes and the effects of antistatic phenomena *(1-7)*. Although these effects can be noted with cotton and wool, the introduction of synthetic fibers has accentuated the problem. Handling methods and operating speeds for cotton and wool have been geared to the limitations imposed by their antistatic and lubricant characteristics. In view of the present high prices of cotton and wool, it would be interesting to consider whether the use of good antistatic agents would permit a wider scope of processing conditions, such as lower humidities and faster operating speeds, at negligible cost.

The antistatic problem as far as textiles are concerned is best divided into two categories: A) fabric usage and B) fiber and yarn usage.

In the case of fabric usage, we believe that triboelectric considerations are to some extent important, since, at the low humidities which are liable to be encountered, electrical conductivity is more difficult to achieve, especially when some degree of wash and dry-cleaning resistance is required of the agent. We have noticed that, with a shirt of untreated acrylic fiber, objectionable electrification effects occurred even at 50% rh.

For the purposes of this paper, we shall discuss especially those agents that are used for fiber and yarn processing. These involve different requirements, and we believe that here triboelectric considerations are less important, partly because of transfer of agent onto the guides etc and because electrical conductivity can be readily employed to dissipate any electrification of the fiber as fast as it is generated.

GENERAL CONSIDERATIONS

CHARGE GENERATION —— Several important points can be developed from a consideration of the charge-generation mechanism. Let us consider a small object. It will of course consist of positive atomic nuclei whose net charge is counteracted by an opposite amount of charge in the form of electrons. However, in the surface monolayer of the object there may be an unbalance, so that there is a charge according to the circumstances and history of the object.

If two such objects are grounded in a shielded environment and allowed to equilibrate, each will attain a slight potential characteristic of its surface. The ground can be considered as an arbitrary zero of potential of sufficiently large capacitance that its potential is negligibly affected by ordinary charges. The amount of charge then held by such an object will be the product of its surface potential and its absolute capacitance, which is a geometric factor.

A given object could thus have an electrically more negative surface potential than another because electrons could, statistically speaking, reside on its surface at a correspondingly lower energy level. This parameter of charge attractiveness is a physicochemical factor similar to chemical bond strength and has been called an electrochemical potential *(8)*. It includes a nonelectrical potential, which compensates for the electrical potential due to the excess electrons and thus prevents them from going to the other object. We would expect these potentials to express the electronegativity and the polarizability of the surface molecular groups, the orientation at the surface, and the closeness of packing.

The resulting electrical potentials have been measured for metals, and monolayers on water, and cover a range of about a thousand millivolts *(9)*. As regards the charge magnitudes, these would be measurable in micromicrocoulombs for small objects.

Now consider the two objects to be brought together. Opposite charges will be induced at the opposing interfaces according to their surface potential difference, their proximity, and their mutual area. If the objects are grounded or electrically contacted, there will be a corresponding charge transfer of ions or of electrons, in effect across the interface, proportional to the surface potential difference, the mutual interfacial area, and the reciprocal of the separation distance. If now one of the objects is ungrounded and then separated from the other, it will exhibit a very appreciable charge measurable in microcoulombs, for example.

From measurements with a Mylar (Dacron) film resting on a glass surface and then separated, we calculated that there was a transfer of about 1 electron per million surface groups (arbitrarily taking a group to be 20 square angstroms). Ap-

* Presented in the Empire Room of the Atlanta Biltmore Hotel in Atlanta, Ga, on Thursday afternoon, Sept 16, 1954, before the session on "Finishing Textiles" with N F Getchell presiding. The revised ms was received by Dec 22 and was submitted to the *Am Dyestuff Reptr* on Jan 5, 1955.

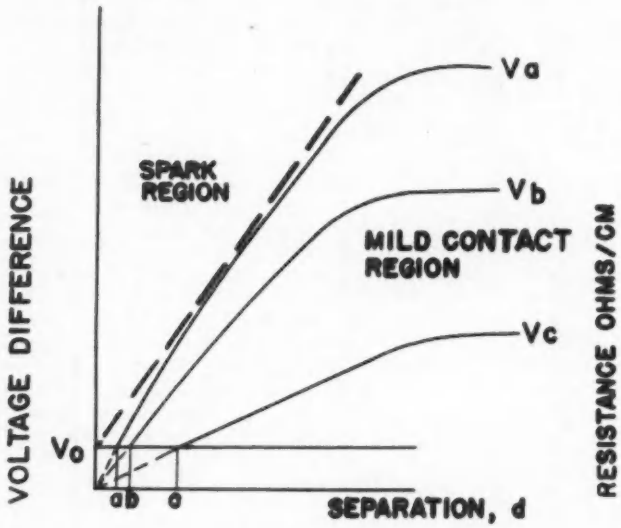

Figure 1
Voltages of Separated Objects of Initial Contact Distances a, b, c

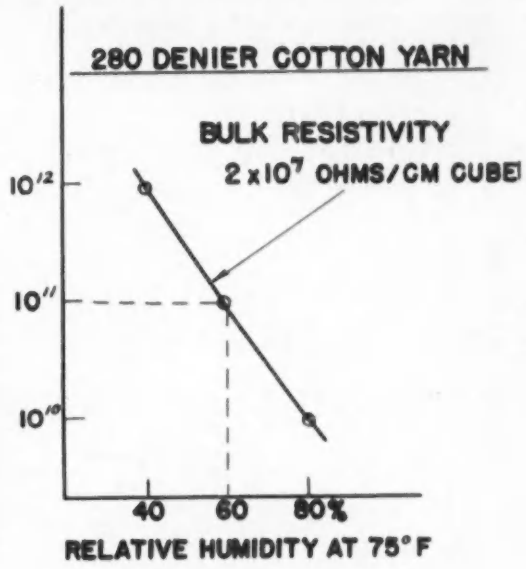

Figure 2
Resistance of Cotton Yarn vs Humidity

proximately 20 times this would be enough to discharge spontaneously into the air.

Now consider the progressive separating of two ungrounded objects in initial electrical equilibrium at a contact potential (surface potential difference) of V_o. As they are separated, their potential difference will expand linearly. This is shown in Figure 1. Since their capacities cannot go below their very small absolute capacitance values, the potential difference between the two bodies will level off. The values Va, Vb, Vc thus result from different proximity values, *a, b, c*. The dotted line in Figure 1 represents the spark breakdown voltage in air for different distances. The exact shape of this is not definite. However, its gradient is approximately 3 volts per micron. An expanding voltage from an initial contact distance smaller than *a* will meet this, spark back to V_o, start again, and give an erratic value. As with oscillatory discharges, it can overshoot V_o, and the final voltage may then be not only erratic in value but erratic in sign. The highest voltage that can be obtained is thus V_o, and this same value can be obtained as a maximum for any pair of substances for appropriate initial contact values unless their surface potentials are substantially identical. Evidence for a maximum of charge transfer was recently presented by Medley *(10)*.

We believe that this Erratic Effect and this Limit Effect have vitiated many charge generation evaluations and evaluation methods. On the foregoing basis, it is apparent that, for any progress in the evaluation of charge generation magnitudes, work must be confined to the "Mild Contact Region" of Figure 1. This probably means no rubbing and, for always the same contact distance, a somewhat problematic assignment.

Correspondingly, also, the virtue of chemically modifying the surface potential of one material to be nearer the surface potential of another would only show up under mild contact conditions or in the permitting of closer initial contact distances. Thus, two materials of surface potentials only one millivolt apart would show a strong charge transfer because of an initial contact distance of one millimicron. This argument could be invoked to explain the recently quoted *(7)* charge transfer between two sheets of polystyrene.

Meanwhile, considerable progress has been made by the rubbing of different materials with each other to determine which becomes positive and negative to each other. In this way, a qualitative ranking, or triboelectric series, can be obtained. A recent one given by Ballou *(5)* was as follows: Positive to negative at 15% rh; wool, nylon, silk, viscose, Cordura, cotton, Fiberglas, spun ramie, acetate, Dacron, Orlon, polyethylene, Saran. Furthermore, Ballou used this approach in devising a blend of fibers which would process satisfactorily.

In 1898 Coehn found such a series to correlate with dielectric constant *(11)*. It would be interesting to establish such a correlation on a more fundamental basis, such as electronegativity and polarizability as previously mentioned.

EXPERIMENTAL

CHARGE DISSIPATION———In textile finishing a softening agent is frequently applied, and in fiber and yarn processing, generally a lubricating agent. Hence, if these agents are sufficiently electrically conductive, any voltage rise on a fiber, yarn, or fabric due to a separation process can then dissipate the charge to ground, or back to the point of origin, or over a wide area, or to any pointed protuberances that are fine enough to permit discharge into the air.

For a lubricated yarn going over a guide, the necessary conductivity to combat the maximum of charge generation can be deduced from the following simple experiment: Six one-yard lengths of 200-denier yarn of poor conductivity were pulled several times through the fingers of a Neoprene glove. There was a maximum amount of ballooning, or divergence, of the yarn obtainable (with conductive yarns, similar ballooning occurred when a potential of 3000 volts was applied). By means of an electrometer, the charge on the yarn was found to be 2.5 millimicrocoulombs per foot. Hence, such a yarn traveling over a guide at 1500 ft/min and exhibiting a maximum electrostatic effect would be picking up 3.75 microcoulombs per minute. A leakage back of two-thirds of this, 4.1×10^{-9} amperes, would leave one-third of the charge on the yarn giving one-ninth the manifestation, such as ballooning. If the maximum of charge generation correlates with a voltage gradient along the yarn

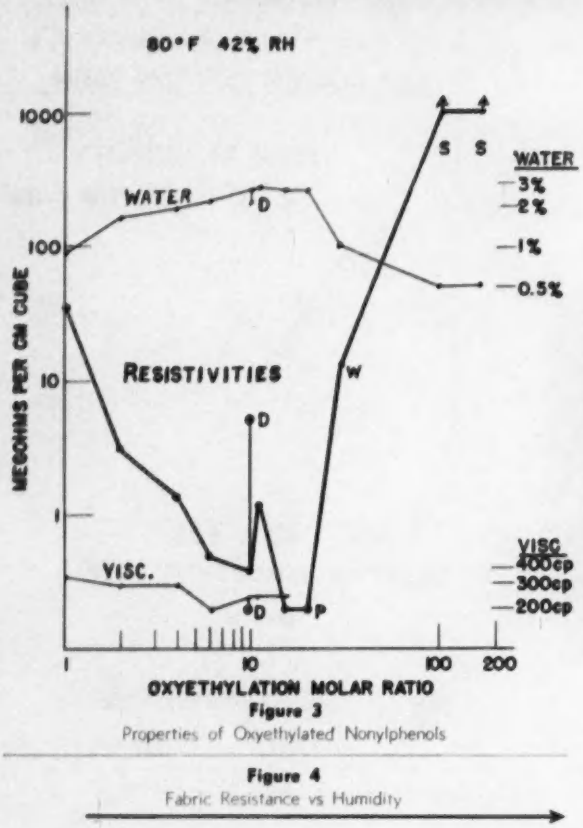

Figure 3
Properties of Oxyethylated Nonylphenols

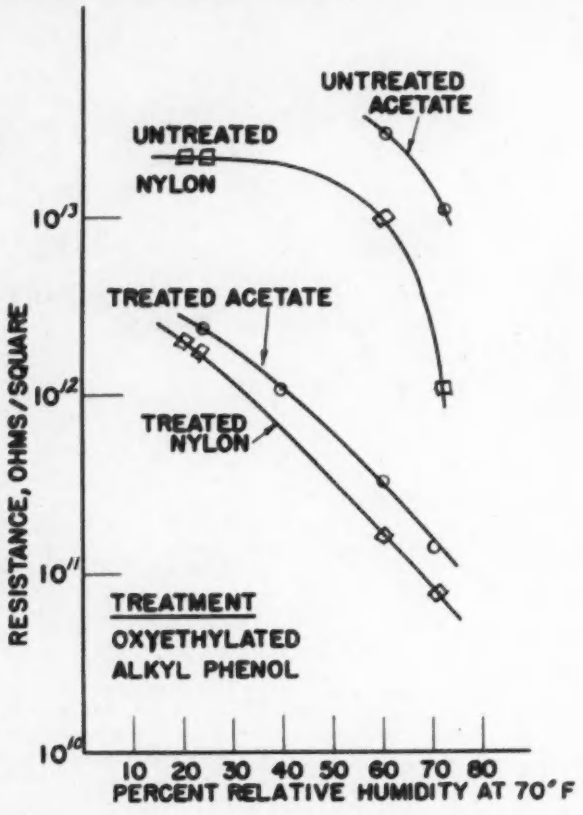

Figure 4
Fabric Resistance vs Humidity

comparable to the spark gradient of 3 volts per micron, then at the one-third value there will initially be a voltage gradient, along the yarn outward from the guide, of 1 volt per micron. For a flow-back current of 4.1×10^{-4} amps, the resistance must be 2.4×10^{10} ohms/cm. Reducing this arbitrarily to allow for an initially low voltage gradient because of a sideways separation from the guide, we can approximate the highest tolerable yarn resistance for a processing rate of 1500 ft/min at a value of 10^{11} ohms per cm.

The data in Figure 2 were obtained with 280-denier cotton yarn. It may be noted that the 10^{11} value occurs at 60% relative humidity. It is thus predictable from laboratory reasoning that 60% rh is the borderline value for the satisfactory processing of this particular cotton yarn at 1500 ft/min.

Now consider the maximum tolerable bulk resistivity in a lubricant applied to a nonconductive yarn: With a 200-denier nylon yarn of density 1.2, the cross-sectional area will be 1.85×10^{-4} cm². Using 0.5% application of lubricant, we get 10^{11} ohms/cm if the bulk resistivity of the lubricant is 10^{6} ohms/cm cube measured at the usage humidity.

In practice, agent transfer onto the guides etc presumably lessens the generation, and lubricants of perhaps 10^{7} ohms/cm cube should be tolerable. For staple processing, the 100-fold reduction in speed is counteracted by the 100-fold resistance due to smaller diameter. However, the finer structure accentuates the electrostatic effects and a lower resistivity is probably required. For fabric usage, inasmuch as low-speed separations are involved, higher resistivities will be tolerable for the same humidity requirement.

RESISTIVITIES ——— The bulk resistivities in ohms/cm cube for liquids range from above 10^{16} for hexane, down to 2.5×10^{7} for highly purified water. Traces of ionic contaminants greatly lower these resistivities; thus, 1 ppm KCl in water gives 5.4×10^{5}; a fresh sample of once-distilled water registered 2×10^{6}.

Figure 3 shows bulk resistivities of experimental oxyethylated nonylphenols conditioned for 2 months at 80°F and 42% rh and measured with a conventional conductivity bridge. The upper curve in Figure 3 shows the moisture content rising to nearly 3%. As this hygroscopicity rises, the bulk resistivity falls. Since a pure oxyethylated nonylphenol would be expected by analogy with ethanol to fall in the range of 10^{8}, it is believed that this conduction is due to the partial solvation and ionization of a few hundred ppm of ash content by atmospheric moisture in accordance with the hygroscopicity of the medium. In this connection, it is interesting to note that Hayek *(12)* recently proposed the theory that antistatic action in many cases was due to the low resistivity of the treated fiber surface occasioned by the absorption of water.

The point D indicates the resistivity of a once-distilled specimen. The ash contents of the other samples were a few hundred parts per million, excepting for the first two and the last three, which were rather higher. As the exact type of ash was not certain in every case, the ash values are omitted since they had no apparent influence on the conclusions. This ash resulted from oxyethylation catalyst, generally sodium hydroxide subsequently neutralized.

The resistivities of the two very high mole-ratio products are exceedingly high, and higher than can be accounted for by their low water content. Also, the mineral content was plentiful. These high values are therefore attributed to the prevention of ion travel by the solid condition of

the material. Thus, water on freezing increases in resistivity by about a million-fold. The influence of viscosity is of course relevant to liquid resistivities. The lower curve shows viscosities for the conditioned samples. Negligible change occurs with oxyethylation ratio. However, the 20- and 30-mole products were respectively a paste and a soft wax. Since they showed good ionic conduction, this is not anomalous if they are regarded as structures or suspensions of solids in liquid.

Figure 4 shows the effect of relative humidity on the resistivity of acetate and nylon fabrics treated with an oxyethylated alkylphenol. It will be seen in Figure 4 that going from 35% to 70% rh gives a 10-fold increase in conductivity. By Henry's Law, the moisture absorption should only be doubled. Evidently, several factors are interrelated, such as viscosity, dielectric constant, and ionic solvation. From some other work, we have found that there is also some deviation from Henry's Law. The humidity slope as in Figure 4 depends on the agent used, but many other agents, including anionics and cationics, give similar slopes.

ANTISTATIC EVALUATION——A number of methods are currently in use to determine charge generation and charge dissipation for treated staples, yarns, and fabrics. To what extent they differentiate between these two parameters or overemphasize one of them is often questionable.

In the evaluation of different textiles by any one charge-generation method, the aforementioned Limit Effect and Erratic Effect and the effect of unrecognized conductivity can readily cause misleading predictions for some of the conditions that may be encountered in practice.

In view of the interpretative difficulties, there have been various efforts to simulate use conditions. Thus, one manufacturer, who is interested in antistatic agents for garments, actually has girls remove garments while he measures the resulting charge.

With any test method, it is essential to maintain a steady temperature and humidity. The AATCC Antistatic Committee has recommended 75°F and 40% rh. Our conditions have been fairly close to this.

In our usual method we squeeze a one-gram tuft of treated staple or a six-inch square of treated fabric vigorously five times in a Neoprene glove and drop it into a metal beaker. This is based on Lehmicke's method *(6)*.

Our electrometer is shown in Figure 5. When there is a charge on the beaker, the rotation of the butterfly condenser results in an induced alternating potential at the oscilloscope input. The amplitude of the resulting wave trace indicates the charge magnitude.

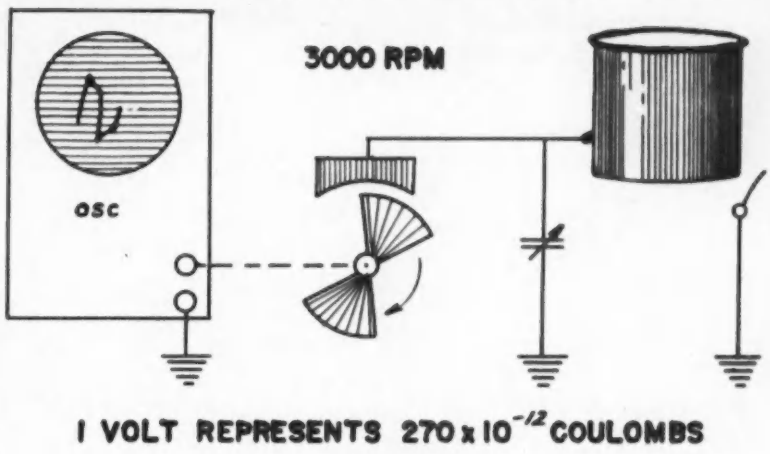

Figure 5
Electrometer for Antistatic Evaluations

The instrument is sensitive to a charge whose potential on the beaker is only 1 volt, if grounded wire screening is appropriately employed. The decade switch on the oscilloscope amplifier permits a range of about 1000 volts. The beaker system has a capacitance of about 50 mmF. The shunt condenser brings it to about 270 mmF and thus makes the voltage readings like those obtained from a typical commercial electrostatic voltmeter, though of much wider range. An interesting feature is that, for a positive charge, the oscilloscope wave trace slopes downwards, and, for a positive charge, the trace slopes upwards, going from left to right.

The test is thus very simple and rapid and is well suited for screening large numbers of lubricated samples at consecutive storage intervals or for studying the effects of such heat treatments as are encountered in processing. Yarns can be similarly evaluated.

The gloves are washed with acetone before use. Each specimen is measured three times and the average is taken. The figures in Table I illustrate the order of reproducibility.

Antistatic agents known to be good fall in the range of 0-50 volt units of charge, but a higher tolerance may be permissible according to operational conditions.

TABLE I

TYPICAL VOLTAGES ON ELECTROMETER

Sample	Consecutive Tests at 80°F, 42% RH	Adopted Value
Cotton fabric	220, 180, 200	200
Nylon fabric	500, 550, 450	500
Acetate fabric	500, 300, 400	400
Acetate + 1% Agent A	140, 60, 70	90
Acetate + 1% Agent B	10, 6, 8	8

The results for the first three fabrics do not necessarily indicate the triboelectric qualities of the materials: firstly, the fabric structures are not identical, and, secondly, much of the fabric-glove contact is in the previously discussed region of firm contact. This is evidenced by the tendency for sparking and crackling to occur in the region of 300-600 volt units and by the fact that charge values greater than these are never obtained with geometrically comparable fabrics.

In the case of treated fabrics, there is some agent transfer between the fabric and the glove. The use of five squeezes ordinarily permits this to occur to the full extent. This agent transfer undoubtedly occurs in mill processing, and a test method should allow for it.

Where fluid agents are on the fabric, it is possible that the charge values obtained represent, to a considerable extent, the rate of leakage of the charge back to the glove during the separation process. This situation seems to apply to a greater or lesser extent to almost all methods involving friction.

The use of Neoprene, because of its position in the triboelectric series, may evoke criticism. However, metals are reputedly close to Neoprene, and Neoprene rollers are sometimes used in carding and pressing. Moreover, the main virtue of this method has been in the investigation of storage changes.

Concurrently with this glove evaluation, we obtain an approximate resistivity value by the simple expedient of applying 60 volts to the beaker and touching the beaker with the tuft of staple or the square of fabric. The following conductivity ratings: n = none, s = slight, m = medium, h = high, can thus be assigned according to the rate at which the 60-v electrometer reading begins to de-

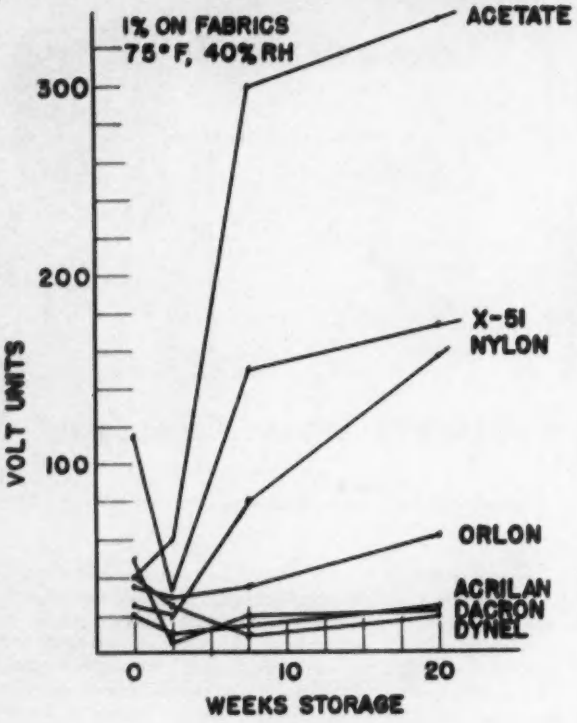

Figure 6
Antistatic Effect vs Storage Using 10-mole Oxyethylated Dodecyl Mercaptan

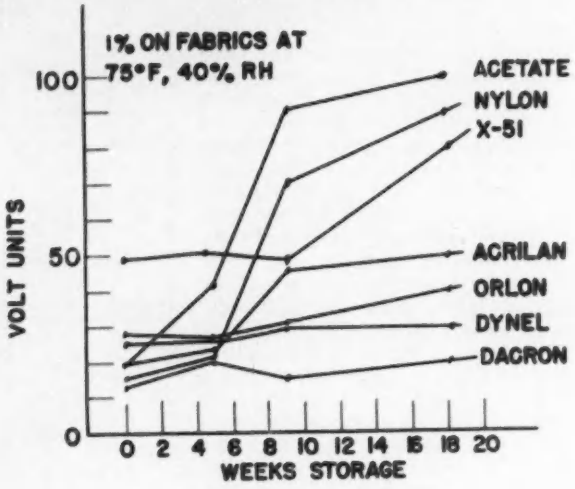

Figure 7
Antistatic Effect vs Storage Using 10-Mole Oxyethylated Nonylphenol

crease. These designations correspond roughly to resistivities of 10^{12} and above, 10^{11}, 10^{10}, 10^{9} and below, respectively, in ohms per square for fabric. In view of these tenfold decrements, the exact method of holding the fabric or staple is ordinarily of little consequence. However, the operator should be grounded, as by touching the wire screening.

EVALUATION RESULTS

From our discussion of resistivities, it would seem simple to devise an antistatic finishing agent of the liquid type. Our discussion is confined to agents of adequate surface activity so that they wet the fiber and do not agglomerate into discrete patches.

However, when the agent is applied to a staple, a yarn, or a fabric, in many cases the expected antistatic effect does not occur. In some cases it lasts only for a few days, or weeks, or months. This storage effect is fairly well known to the trade and is especially troublesome with nylon and acetate and with certain staple fibers in a "green" condition. It is also generally recognized that this is usually due to diffusion of the agent into the fiber.

The fact that the agents are often more satisfactory on the more difficultly dyeable fibers, such as glass, Orlon, and Dacron, suggests that oxidation or volatilization is not usually involved.

In some cases there seems to be a limit to the amount which goes in, so that an adequate application will store indefinitely. This storage factor is especially important, therefore, in trying for minimal usage of an agent. For use on staple a storage life of up to a year is sometimes essential.

If we take the view that the storage loss is due to diffusibility, then it is reasonable to suppose that the shape and size of the molecule will be important factors.

The results of glove evaluations of some experimental oxyethylation products will illustrate this situation. Figure 6 is for a 10-mole oxyethylated tertiary dodecyl mercaptan at 1% on different fabrics. After six weeks the antistatic effect of the agent on acetate, X-51 and nylon has appreciably diminished.

In Figure 7, for a 10-mole oxyethylated nonylphenol, also at 1%, the storage was sufficiently better to permit an expanded ordinate scale. However, similar deterioration was evident after 10-20 weeks. Similar curves have been found for many agents, including nonionics, anionics, cationics.

It will now be of interest to note the mole-ratio effect in the case of the nonylphenol series previously discussed under "resistivities." The following data are for 0.5% application.

Figures 8, 9, and 10 show results with these oxyethylated nonylphenols on Dynel, nylon, and Orlon after zero and after 21 weeks' storage at the standard conditions. It is interesting to note that the curves are much like the curve of bulk resistivities in Figure 3, and, furthermore, the deduced criteria for tolerable resistivities correlate quite well with the previously mentioned glove-method criteria for satisfactory processing. This supports but does not prove our earlier contention that the glove results represent to some extent the leakage of the charge back to the glove during the separation process. The conductivity ratings of these fabrics also correlated with the glove results, but were less sensitive and are omitted.

From Figures 8, 9, and 10, there is evidently a marked absorption with the Dynel and nylon, resulting in an increase of the charges obtained.

Although the Orlon curves show little absorption effect, the 10- and 11-mole data suggest some preferential absorption in this hydrophilic-lipophilic region.

Figures 11, 12, and 13 show the results obtained with an oxyethylation series of a specific experimental alkylated phenol on the same three fabrics. Here, indications of absorption are much less pronounced, especially with the Dynel and the nylon, and many may fall within the limits of experimental error. Although this particular mole ratio series in Figures 11, 12, and 13 was run only for the 21 weeks' period, the superior storability of individual oxyethylation products of this and similar alkylated phenols has been well substantiated at various application levels on staples and fabrics for periods of over a year.

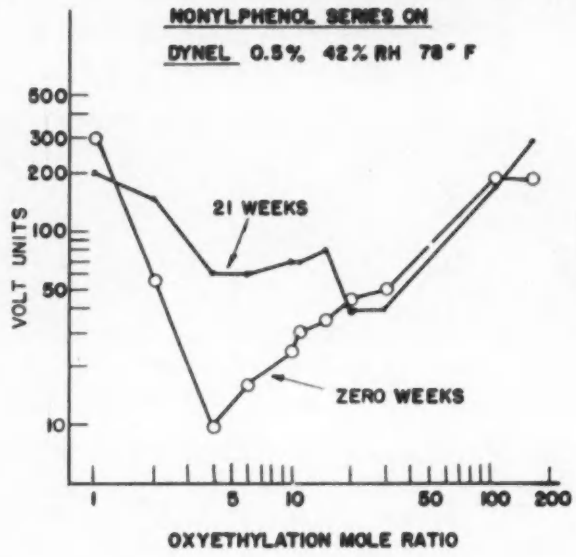

Figure 8
Antistatic Effects vs Oxyethylation

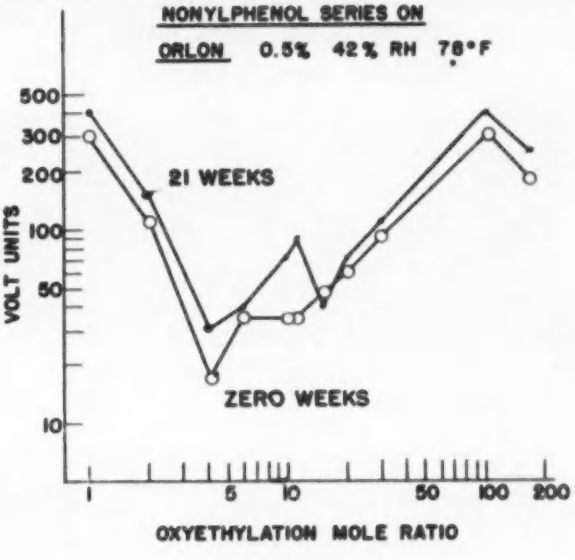

Figure 10
Antistatic Effects vs Oxyethylation

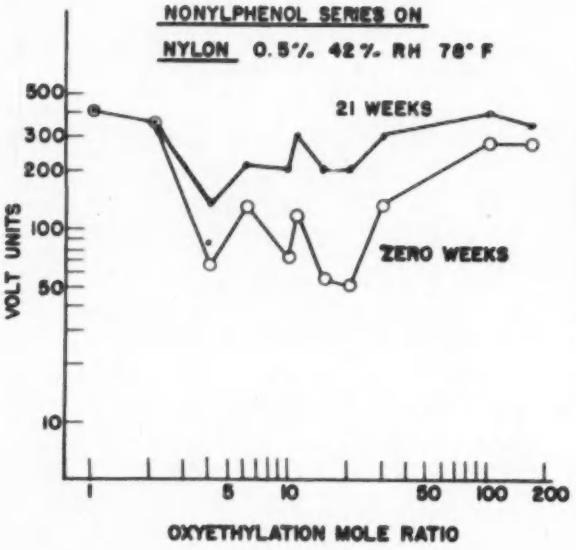

Figure 9
Antistatic Effects vs Oxyethylation

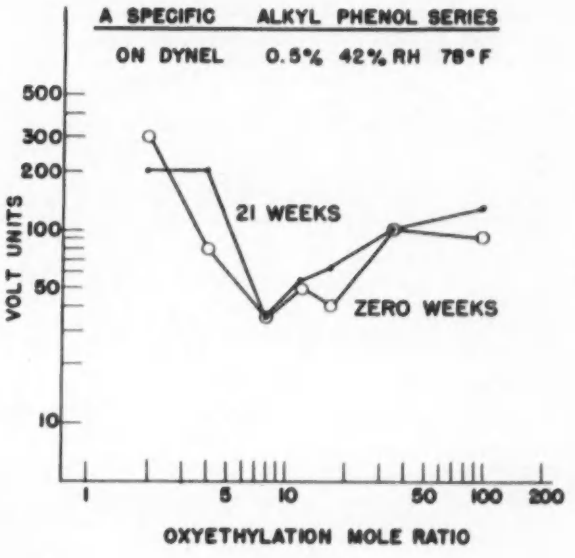

Figure 11
Antistatic Effects vs Oxyethylation

Storage data were obtained for oxyethylated tallow acids from 3 to 20 moles of oxyethylation. Here the storage on nylon and acetate was very poor but was best with the longer oxyethylation chains. Oxyethylated glycols were similar.

In general, increasing size and complexity in the hydrocarbon portion is found to give better storage properties. The oxyethylation products studied in this work can be designated by their end groups and ranked as follows:

Glycol	poor storage
Tallow acid	poor storage
Dodecyl mercaptan	fair storage
Nonylphenol	medium storage
Diamylphenol	medium storage
Specific experimental alkylated phenols	good and excellent storage

EVALUATION SCOPE —— For the evaluation of antistatic agents, the preceding work discusses the conductivity criteria, the glove-test criteria, and the storability criteria. Charge generation and agent transfer with respect to a contacting material other than Neoprene may also deserve attention. However, some of these agents have been used successfully in several mill applications. Some have also been used successfully as rinse treatments for synthetic apparel *(13, 14)*.

An antistatic agent must meet a number of other criteria: for example, solubility

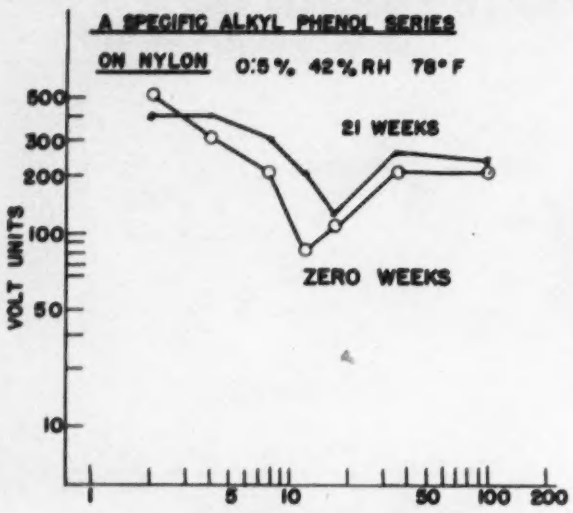

Figure 12
Antistatic Effects vs Oxyethylation

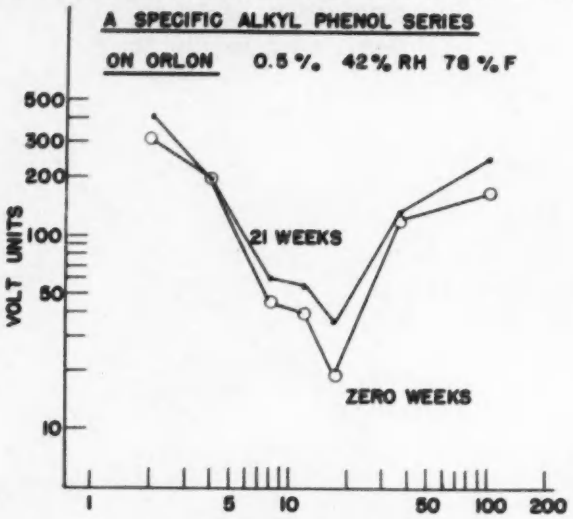

Figure 13
Antistatic Effects vs Oxyethylation

or emulsifiability, scourability, compatibility with sizing agents, compatibility with finishes, physiological inertness, noncorrosiveness, and lubricity. For fabric usage, odor, color, hand, and inertness towards dyes are also important. In all of these respects nonionic agents are attractive and offer versatility via the appropriate choice of hydrophobic group and oxyethylation ratio *(13)*.

SUMMARY

Some aspects of charge generation were discussed, especially as regards evaluation methods. Also, on this basis, the amount of conductivity needed for antistatic action in actual use was deduced.

Bulk resistivities in the oxyethylated nonylphenol series were discussed. The antistatic efficiencies of oxyethylated materials were investigated, especially as regards storage.

For antistatic action a certain amount of oxyethylation is necessary with low hygroscopicity materials, but not so much that complete solidification results.

Increasing oxyethylation improves storability, but for good storability an adequate size or complexity of hydrocarbon portion is needed.

ACKNOWLEDGMENT

The author takes great pleasure in thanking G M Gantz, C F Jelinek, and R L Mayhew for continued help and encouragement in the development of this project.

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(3) Edelstein, S M, *ibid* 41, P518 (1952).

(4) Trinchieri, G, *Textile Age*, Sept 1954, pp 70-74.

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(13) Jelinek, C F, and Mayhew, R L, *Textile Research J* 24, 765 (1954).

(14) Unpublished usage tests by personnel of Antara Chemicals Division, General Aniline and Film Corporation, N Y.

DISCUSSION

Question: Much attention in this paper was directed toward the measurement of conductivity for an indication of the static formation that could be expected. We have found, particularly on the case of wearing apparel, that static formation in textiles does not always vary with conductivity. Do you care to comment on the relative value of conductivity and other methods?

Answer: The glove method is not very appropriate for wearing apparel. With cotton, for example, the results are rather close to the upper limits. However, it is valuable for the powerful antistatic action needed in processing. We could expect the charge-generation properties to be less affected by storage than the conductivity, since a remaining trace of agent should be externally similar to an initial heavy application. For durable solid films on garments, the true charge-generation properties may be well worth studying by an unambiguous test method. However, there is the obvious limitation that if you make a thing electrically compatible with one material, you make it incompatible with other materials.

For processing conditions, the charge-generation approach may not help much, and, in any case, you can get such adequate control with the conductivity approach.

There are various opinions on this subject and we shall be glad to argue it further.

MID-WEST SECTION MEETING PHOTOS

February 12, 1955 • Bismarck Hotel, Chicago, Ill.

(See meeting report under "Activities of Local Sections")

AT THE HEAD TABLE (l to r): Samuel M Littlejohn, Munsingwear, Inc, vice chairman; Ernest L Caswell, Ciba Co, Inc, guest speaker; Arthur I Hultberg, Bear Brand Hosiery Co, chairman; Ray A Clarke, E I du Pont de Nemours & Co, Inc, guest speaker; Harry W Ericson, American Aniline Products, Inc, secretary; Jack G Kelley, E I du Pont de Nemours & Co, Inc, treasurer.

(L to r): John A Turner, E I du Pont de Nemours & Co, Inc; Arthur J Andrews, Keystone Aniline & Chemical Co, Inc; Elliott Morrill, The Best Foods, Inc; Samuel Klein, American Cyanamid Co, councilor; Eric W Camp, National Aniline Division, Allied Chemical & Dye Corp, councilor; Z O Meyer and J E Lang, Phoenix Dye Works.

(L to r): R C Lakey, Nopco Chemical Co; Heinz A Lips, E I du Pont de Nemours & Co, Inc, Thomas L P Spanley, Western Felt Works; Joseph G Baric, E I du Pont de Nemours & Co, Inc; Kenneth J Giese, Chippawa Falls Woolen Mill Co; Albert R Breen, dyeing equipment broker; John C Moertel, E I du Pont de Nemours & Co, Inc.

***Standing (l to r):* Frank F Beverly, Joanna Western Mills; Arthur E Patton, Yale Woolen Mills; J Gordon Stott, Ciba Co, Inc. *Seated (l to r):* Rudolph Zwicky, Helam Chemical Co, Inc; Jacob Lorch; L B MacFarland, American Aniline Products, Inc; William H Bultman, The Best Foods, Inc; Frank S Stover, American Aniline Products, Inc.**

RHODE ISLAND SECTION MEETING PHOTOS

January 27, 1955 · Crown Hotel — Providence Engineering Society · Providence, R I

Speakers: Albert C Nuessle, Rohm & Haas Co (top row, left)
Raymond W Jacoby, Ciba Co, Inc (top row center)

February 24, 1955 · Narragansett Hotel · Providence, R I

Speaker: John P Cleaver, Walter V Clarke Associates, Inc (top row, left)

(Photos by John Treise)

Membership Applications——

(Concluded from page P215)

Theodore E Nestler — Tech Dept procurement officer, American Cyanamid Co, Bound Brook, N J. NY. Sponsors: H E Millson, W Keass.

George P Vincent — Chemical executive, Olin Mathieson Chem Corp, Baltimore, Md. W. Sponsors: G J Mandikos, H C Chapin.

JUNIOR

Jan P Mengel — Assistant supt, Brandts Kladefabrik, Odense, Denmark. Sponsors: J H Shelton, J A Hopwood.

ASSOCIATE

Walter V Fox — Treasurer, Fox Chemical Service, Inc, Berwyn, Md. W.

Richard C Hoffman — Foreman, Yarn & Stock Dyeing Dept, Fairforest Co, Eagle & Phenix Div, Columbus, Ga. SE.

Marjory L Joseph — Instructor in textiles & clothing, Juniata College, Huntingdon, Pa. PHIL.

APPLICATION FOR TRANSFER TO SENIOR MEMBERSHIP

John M Privette
Robert A Schoellhorn

A MODIFICATION OF THE AATCC FLAMMABILITY TESTER

EPHRAIM FREEDMAN and DAN CHAUCER

Bureau of Standards, R H Macy & Co, Inc
New York, N Y

SINCE the original development of the AATCC Flammability Tester in 1945, numerous improvements have been suggested and, in some instances, they were found to increase the accuracy of testing or result in reduced time required to carry out large numbers of tests. The AATCC Flammability Tester, which is the approved test instrument specified in the Commercial Standard CS191-53 for Flammability of Clothing Textiles, is an instrument designed to measure the rate of travel of a flame over a textile fabric supported at an angle of forty-five degrees. The tester consists of a draft-proof ventilated chamber enclosing a standardized ignition medium, a sample rack, and an automatic timing device.

The automatic timing device of the official Flammability Tester consists of a driving mechanism mounted on the rear of the cabinet. This mechanism moves the gas jet to cause the ignition flame to come in contact with the surface of the test specimen at the same time actuating a stop-watch timer through a leverage system. Severance of a cord by the flame of the burning test specimen allows a falling weight to actuate the leverage system to stop the timer.

Electric timing has been suggested in the past for use in connection with the measurement of rate of burning on the Flammability Tester. Various circuits have been tried from time to time. The California State Fire Marshal used electric timing in 1945, and other electric arrangements were utilized subsequently by the AATCC Research Laboratories, and commercial and consumer testing laboratories. Modification of the standard mechanical system by changes to increase the sensitivity of the leverage system was carried out by the U S Testing Company, authorized manufacturers of the instrument.

With the enactment of the Federal Flammability Act and the resultant increase in testing activity, interest has been renewed in the development of an electric system of timing which might be positive in action and permit increased accuracy and speed of testing. The circuit described here has been found to function with extreme reliability and was installed at an approximate cost of $75, excluding labor.

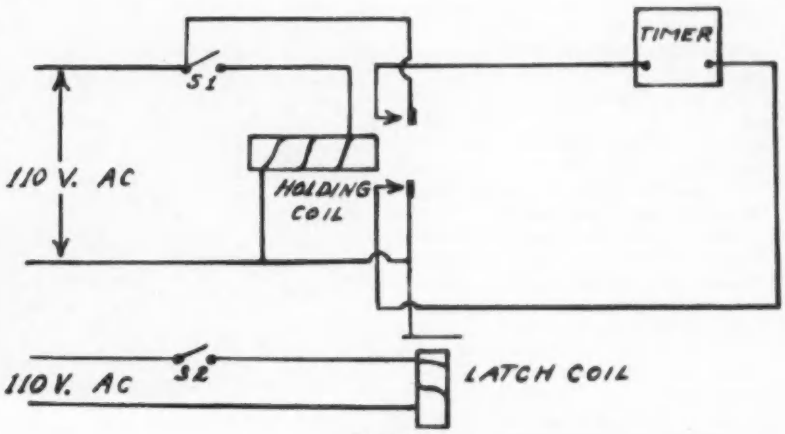


Figure 1

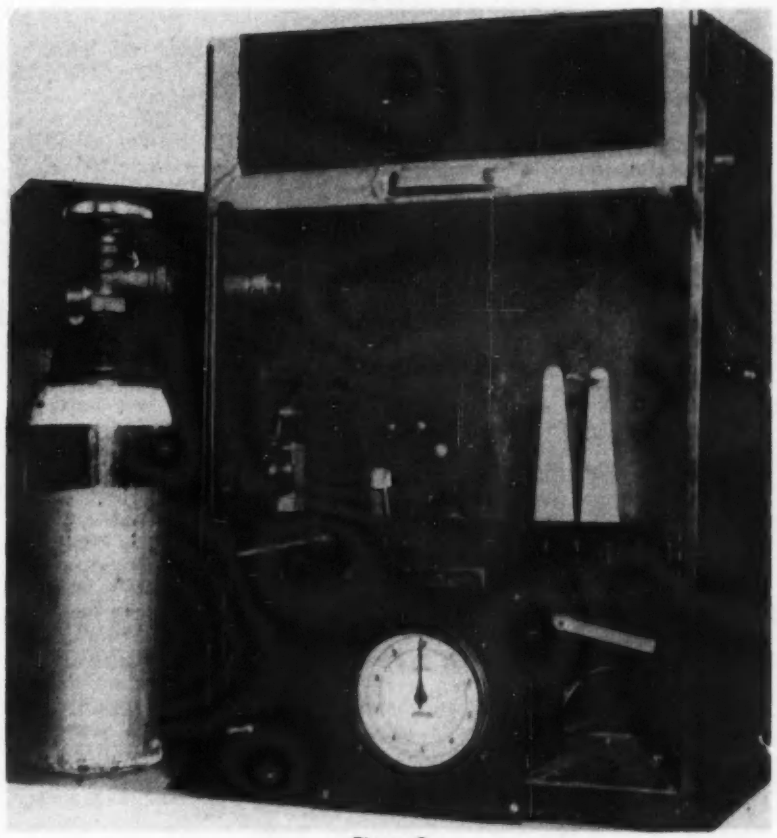


Figure 2

The equipment used in the modification was as follows:

1 Timer-Model S-10 manufactured by the Standard Electric Time Company of Springfield, Massachusetts.

2 Micro Switches Catalog No.'s BZ-2RL2-A2 and BZ-2R-A2

2 Micro Switch Enclosures Catalog No. 1-PA-2. (Electrotec 1954 Catalog).

1 Potter Brumfield Latching Relay.

1 Line Switch.

1 Pilot Light.

A circuit diagram is shown in Figure 1. Figures 2 and 3 show photographs of the front and rear surface of the machine. In our modification the clock face was mounted in the vertical plane beneath the sample rack. The base was partially cut out to accommodate the clock. The relay was mounted on the base to the left of the clock. A panel board on which was mounted the line switch and pilot light was located so as to completely enclose the relay. The lower section to the right of the clock has been left open as before to store sample racks or other equipment incidental to the use of the machine.

The micro switch with the cam-operated roller follower was mounted behind the machine on the flame advance timing mechanism. It is actuated by the circular cam which causes the micro burner to advance. Its positioning is such that the switch is actuated at the exact moment that the burner advances. Once energized, the clock will continue in operation until the relay is unlatched by the action of the second micro switch. This switch has been placed inside the combustion chamber close to the space formally occupied by the weight platform. Switch action is accomplished by means of an adjacently mounted cantilever spring. The spring is maintained in the raised position by the thread, and released when the thread is severed by the flame. The thread is secured by looping it under a roller affixed atop the cantilever spring and bringing it up to a locking screw. The locking screw is secured to the left side of the tester with a machine screw.

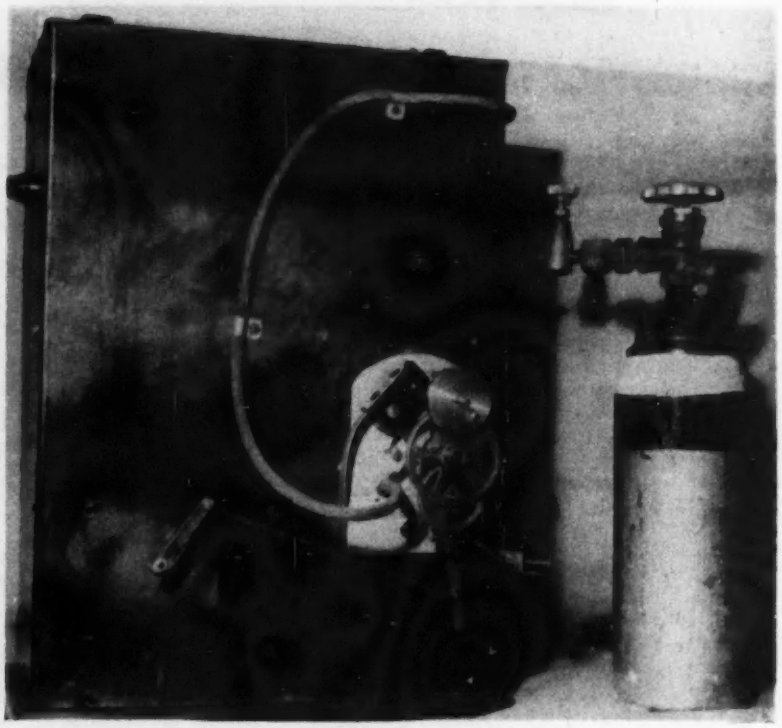


Figure 3

One unique advantage of this timing system is that it allows for accurate adjustment of the one-second burner advance period. By making a test run without either sample or thread in place, the clock starts at the moment the burner reaches the advanced position and stops as soon as it is released. The one-second cycle was made adjustable by securing the clock drive spring to an adjustable screw. A bracket is secured to the back to hold the screw.

GENERAL CALENDAR OF COMING EVENTS

AMERICAN SOCIETY FOR TESTING MATERIALS
58th Annual Meeting—June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, N J.

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS & CHEMISTS (Quebec Section)
Symposium: Apr 15 (Ciba Company's Conference Room, Montreal, Que).

Other events: (all at the Sheraton-Mount Royal Hotel, Montreal): Apr 21-23 (Textile Exhibition); Apr 22 (19th Annual Meeting); Apr 23 (19th Annual Dinner); June 18 (Annual Golf Tournament).

DELTA KAPPA PHI FRATERNITY
1955 Annual Convention—April 29-30, Lowell, Mass.

DEUTSCHE GESELLSCHAFT FUR CHEMISCHES APPARATEWESEN
Achema XI—May 14-22, Frankfurt am Main, Germany.

DRYSALTERS CLUB OF NEW ENGLAND
Apr 29 (Hotel Vendome, Boston, Mass); June 24 (Outing—Wachusett Country Club, W Boylston, Mass).

THE FIBER SOCIETY
Spring Meeting—May 4-5, 1955, Alabama Polytechnic Institute, Auburn, Alabama.

Fall Meeting—Sept 8-9 1955, Massachusetts Institute of Technology, Cambridge, Mass.

INSTITUTE OF POLYMER RESEARCH
Symposium: Apr 2 (Polytechnic Institute of Brooklyn, Brooklyn, N Y).

INTERNATIONAL TEXTILE EXHIBITION
2nd Exhibition—June 25-July 10, 1955, Brussels, Belgium.

INTERNATIONAL WOOL TEXTILE RESEARCH CONFERENCE
September, 1955—Sydney, Melbourne, and Geelong, Australia.

INTER-SOCIETY COLOR COUNCIL
24th Annual Meeting—April 6, Skytop, Hotel Statler, New York, N Y.

NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS, KNITTED OUTERWEAR ASSOCIATION, THE UNDERWEAR INSTITUTE
42nd Knitting Arts Exhibition—April 25-29, Convention Hall, Atlantic City, N J.

NATIONAL COTTON COUNCIL OF AMERICA
1955 Chemical Finishing Conference—Sept 20-21, Chalfonte-Haddon Hall, Atlantic City, N J.

PHI PSI FRATERNITY
Annual Meeting—April 14-16, Beaconsfield Hotel, Brookline, Mass.

SOUTHERN MUNICIPAL AND INDUSTRIAL WASTE CONFERENCE
4th Annual Conference—Mar 31-Apr 1, College of Engineering, Duke University, Durham, N C.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION
Apr 13, May 11, Sept 14, Oct 11, Nov 9 (Hotel Commodore, New York, N Y); June 9-11 (Outing———The Greenbrier, White Sulfur Springs, W Va).

TAPPI (Metropolitan District)
Apr 12, May 10 (Fraunces Tavern, New York).

ABSTRACTS

The Application of Resins to Textiles

A R Smith, *J Soc Dyers Colourists* 70, 381-91, September, 1954.

Broadly speaking, the name "plastics" is applied to substances that flow under heat and pressure, and that are produced from simpler starting materials by chemical reaction. Plastics are generally subdivided into thermoplastic and thermosetting materials, the former being repeatedly deformable under heat and pressure, while the latter, although flowing under the initial heating and pressing operation, undergo further chemical changes during this operation, so that subsequent deformation is no longer possible.

Thermoplastic materials include the polyvinyl derivatives, cellulose acetate, nylon, and Terylene. The condensation products of formaldehyde with phenol, urea, melamine, and similar compounds are thermosetting. Rubber may be regarded as thermoplastic in its natural form, while its vulcanization is a thermosetting process.

In textile finishing, thermoplastic resins are most frequently employed for producing firmness of handle in the fabric, and for this purpose are applied as an emulsion of the polymerized product. No further polymerization is required after their application, and the characteristic of such finishes is that they soften at increased temperatures. Thermosetting resins, on the other hand, are usually applied as precondensates, and further condensation on the fabric is necessary if a permanent wash-fast finish is to be obtained.

The author confines his paper mainly to the uses in textile finishing of urea- and melamine-formaldehyde resins, which find more extensive application than other plastic materials. However, other synthetic resins used in the textile industry are also referred to occasionally. The chemical reactions involved in the preparation of the resins are discussed at considerable length.

The application of the resins to textiles is discussed under the following headings:

1) Crease-resistant and shrink-resistant finishes on cellulosic fabrics.
2) Permanent glazed or embossed finishes on cellulosic fabrics.
3) Shrink-resistant finishes on wool.
4) Permanent stiffened finishes on cellulosic fabrics.
5) Improvement of color fastness.
6) Pigment printing and padding.
7) Miscellaneous (showerproofing, flameproofing, stabilization of lace and net, stiffening of synthetic-fiber fabrics).

Seventy-seven references to the literature, mostly patent specifications, are cited.—WHC

The Effect of Outdoor Exposure on Cellulosic and Other Textile Fibers

M L Staples and C J Brown, *Book of Papers, 4th Canadian Textile Seminar*, p 132-6.

The fact that most textile fibers are damaged by prolonged outdoor exposure has been recognized for many years. All natural fibers and some synthetics are susceptible to photochemical attack, and this property has restricted the successful use of these fibers in fields where a high resistance to weathering is required.

During outdoor exposure, fiber breakdown usually results from the combined action of several factors, of which the radiant energy from the sun is perhaps the most important. The presence of moisture vapor, oxygen and other gases in the atmosphere also plays a part, and attack by microorganisms may be serious, particularly in hot humid climates.

The work of earlier investigators in this field is reviewed, and 23 references to articles on this subject published during the last 30 years are cited.

A study was made by the authors of the photochemical degradation of fabrics made from regular and high-strength viscose rayons and of the effect of certain compounds in preventing fiber damage during weathering.

It was found that lead chromate, aluminum hydroxide, urea-formaldehyde and Velan finishes will protect viscose rayon against the action of sunlight.

Certain treatments such as acid formaldehyde and Avcoset that are normally applied as stabilizing finishes will not inhibit the actinic degradation of viscose rayon.

High-strength viscose may possess slightly better resistance to photochemical action than regular viscose, but the difference is not striking. Cotton was found to be approximately equal to high-strength viscose and a little more resistant than regular bright viscose.

The Orlon duck fabric used in the investigation possessed the best resistance to sunlight attack. The Orlon marquisette, however, underwent a considerable amount of degradation. Dull viscose was damaged much faster than bright viscose, and dull nylon showed about the same resistance as delustered viscose.

All fabrics exposed in a city atmosphere were found to degrade much more rapidly than those which were exposed in the country.

Fabrics which were exposed without covering degraded most rapidly, those under polythene film ranked next, and the least damaged samples were those exposed under glass.

The authors conclude that further work is needed before the mechanism of protection against photochemical degradation of textile fibers is completely understood.—WHC

Dyeing of Wool and Wool/Synthetic Blends

H D Grimes, *Book of Papers, 4th Canadian Textile Seminar*, p 72-6.

The dyeing of wool/synthetic blends is a far more complicated process than is the dyeing of any one of the individual fibers. A tremendous amount of laboratory and plant work has been done by the fiber, dyestuff, and textile industries to establish the procedures outlined in this paper. Further information and greater detail are available, in most cases, from the manufacturers of the various synthetic fibers and from the technical departments of most of the larger dyestuff companies. Even after the acquisition of all available information in any specific field, general experience indicates that plenty of ingenuity must be exercised by the dyer and dye technicians in the textile plants to produce merchantable piece goods on some of these blends of wool and synthetics.

It is still best in some instances to dye the new fibers as raw stock or top for subsequent blending. The dyeing of blends in the piece is quite frequently an objective sought by those who are interested in flexibility of production, and in most cases presents the greatest difficulties and hazards.

In the wet finishing of practically all of the fabrics which contain wool and synthetics, the wool tends to rise to the surface of the fabrics and the synthetics become buried within the fabric. This phenomenon apparently, in major part at least, is the result of both the fulling and the scouring operations. This characteristic, which appears to be more or less common to all of the synthetic fibers when blended with wool, presents some assets and some liabilities. These are discussed by the writer.

The established procedures that have been adopted for the dyeing of each of the individual synthetic fibers are listed. Blends of wool/nylon, wool/Dacron, wool/Orlon 42, wool/Acrilan, wool/Vicara, and wool/Dynel are then discussed separately at considerable length. The writer recommends in many cases specific dyes which have been found suitable for these purposes.—WHC

• PATENT DIGEST •

PAUL WENGRAF

• German Patents

FOR the convenience of readers of the "Patent Digest", there appears below a number of German patents which have been listed in *Deutsches Patentblatt*. Space limitations prohibit our reviewing them, but the complete original specifications may be obtained from the sales Department, Deutsches Patentamt, Gitschiner Str 97-103, Berlin SW 61, Germany. Translated abstracts may be obtained for a nominal fee from Dr Paul Wengraf, 88-36 Elmhurst Ave, Elmhurst 73, N Y.

German Pat No.	Date	Assignee and Title
916,763	7/8/54	Bad Anilin— & Sodafabrik, "Method of preventing wetting of cellulose hydrate fibers"
916,764	7/1/54	Bad Anilin- & Sodafabrik, "Hydrophobing natural or artificial fibers, yarns or fabrics therefrom"
916,643	7/1/54	Etablissements Kuhlmann, "Printing fabrics with pigment-containing pastes in form of aqueous emulsions"
917,002	7/15/54	Sandoz AG, "Dyeing furs"
917,662	7/29/54	Bradford Dyers Assoc Ltd, "Increasing the stability of mechanical finishing effects on textiles"
917,482	7/29/54	Allg Elektricitaets AG, "Method of producing water repellent, flexible and resilient fibers, threads and fabrics"
918,264	8/12/54	Farbwerke Hoechst, "Process of increasing the wearability of natural and synthetic fibers and of yarns and fabrics made therefrom"
918,631	8/19/54	Deutsche Gold- & Silber-Scheide Anstalt, "Process of bleaching bast fibers"
918,442	8/19/54	Farbwerke Hoechst, "Process for imparting water repellency to natural or synthetic fibers"
918,663	8/19/54	Nederlandsche Org for Toegepast—Van Nijverheid, "Process for dyeing a color, exactly matching with a given sample and means for finding the formula"
918,634	8/19/54	Farbwerke Hoechst, "Dyeings on acetate of cellulose, linear polyamides or polyurethanes, fast to cross dyeing"
918,635-6	8/19/54	Farbwerke Hoechst, "Process of producing fast dyeings and prints"
918,743	8/26/54	Ciba AG, "Improving the fastness properties of dyeings and prints obtained with water-soluble dyes"
918,808	8/26/54	Ciba AG, "Dyeing tightly packed wool in acid media and dye preparation (therefor)"
918,922	8/26/54	Bad Anilin- & Sodafabrik, "Process of producing prints, impregnations and coatings on textile materials"
918,982	9/2/54	Deutsche Hydrierwerke, "Process of preparing quaternary nitrogen compounds"—cl 12q
919,286	9/9/54	Farbwerke Hoechst, "Process of simultaneously bleaching and dyeing"—cl 8m
919,290	9/9/54	May & Baker Ltd, "Preparing organic thiocyanates"—cl 12o
919,530	9/16/54	Badische Anilin- & Sodafabrik, "Printing dyed fabrics made from cellulose esters or ethers, polyamides or polyurethanes"—cl 8n
919,707	9/23/54	Badische Anilin- & Sodafabrik, "Process for improving (finishing) textile materials"—cl 8k
919,708	9/23/54	Farbenfabriken Bayer, "Rendering fibers water repellent"—cl 8k
919,709	9/23/54	John A Benckiser, "Process of fulling wool and hair material"—cl 8k
919,947	9/30/54	Badische Anilin- & Sodafabrik, "Process of impregnating textiles"—cl 8k
920,785	10/21/54	Heberlein & Co, "Process of transparentizing natural and artificial fibers and fabrics containing same"—cl 8k
921,021	10/28/54	Farbwerke Hoechst, "Process of producing black dyeings, fast to steaming, on polyamide fibers"—Cl 8m,1,01
921,751	11/18/54	Kalle & Cie, "Finishing composition"—Cl 8k,1,08
923,005	12/16/54	Pierer & Schubert, "Process of producing dyeings and colored effects on every kind of textile"— 61 8m
922, 943	12/16/54	Bad Anilin- & Sodafabrik, "Method of pigment printing, impregnating and coating fibrous materials" (Additional patent to 918,922)—Cl 8n
923,606	12/30/54	Bobinger Akt Ges f Text, "Process of improving fibers and fibrous materials"—Cl 8k
923,544	12/30/54	Pierer, "Process of simultaneously dyeing and finishing textiles"—Cl 8m

DYEING DACRON OR NYLON IN CONTINUOUS PROCESS ———Short Heat Aftertreatment C,4,07

U S Pat 2,663,612-13 (Du Pont——Gibson Jr ——Dec 22, 1953)

The introduction to U S Pat 2,663,612 stresses the difficulty of dyeing hydrophobic fibers in general, thus nylon, polyacrylonitrile and polyethylene terephthalate fibers, in customary dyeing methods.

According to the examples and claims of this patent, it covers a dyeing process for Dacron, while copending U S Pat 2,663,613 is concerned with coloring nylon. Both patents essentially have in common an aftertreatment of the fibers at temperatures between 180-230°C for a very short time———for Dacron 5 seconds to less than one minute, and for nylon, up to 2-3 minutes. This treatment therefore can be applied to the aforementioned synthetic filaments of higher heat resistance only, excluding other thermoplastic fibers, such as cellulose acetate, that become stiff at temperatures over 180°C.

The exposure to heat can be effected in any known way, for instance, by passing continuously over a heated drum or through a melted-metal-alloy bath or through a flue drier, optionally under infrared radiation. Fibers are first padded in a solution or dispersion of the dye, then dried and exposed to heat, and finally well soaped to remove the loosely adhering, nonfixed dye particles.

According to U S Pat 2,663,612, Dacron may be *continuously* dyed with insoluble dispersed dyes of the acridone or aminoanthraquinone series, vat dyes, eg, Indanthrene Red Violet RRK (CI #1161), or with azo or pigment dyes.

According to U S Pat 2,663,613, nylon can be dyed with a wide variety of soluble (acid and chrome complex acid) dyestuffs or dispersed dyes the same way as above in a continuous process.

Among the references cited by the Patent Office to both patents:

U S Pat 2,532,437 (Am Viscose/1950): dyeing polyacrylonitrile fibers with a large series of insoluble azo dyes, drying and heating to 120-125°C for at least one hour.

U S Pat 2,543,316 (Carbide & Carbon/1951): dyeing dyestuff-impregnated polyacrylonitrile fibers under pressure in the presence of moisture at elevated temperatures [cf *Am Dyestuff Reptr 40*, 375 (1951)].

U S Pat 2,577,846 (Carbide & Carbon/1951): depositing a thin film of dyestuffs

(acetate, basic, oil-soluble) on a vinyl halide-acetate copolymer fiber, and exposing the filaments for a short time to temperatures between 105-200°C while stretching [cf *Am Dyestuff Reptr* 41, 275 (1952)].

Reference may be made further to the report on the "Thermosol" method of dyeing in *Am Dyestuff Reptr* of Jan 5, 1953 by Gibson, Jr, Knapp and Andres.

ANTISTATIC AND FLAMEPROOFING AGENTS———

Condensing Polyhydroxy Compounds with Alkylphosphates and Aromatic Diisocyanates G,2,03

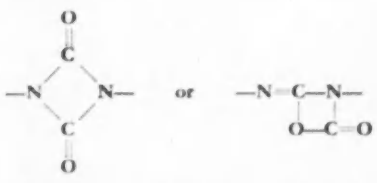
U S Pat 2,691,566-67
(Du Pont—Kvalnes, Brace—Oct 12, 1954)

Organic phosphorus compounds are widely used for flameproofing and antistatic purposes. Since these effects are not durable it has been suggested that the phosphorus compounds be combined with resins. However, fixation is not satisfactory in this event, for it is necessary that the phosphorus compounds be attached to the fiber *by a true chemical union*. Herctofore all efforts to bring about such chemical reactions have failed because the methods ask for very severe conditions which cause tendering of the fibrous material.

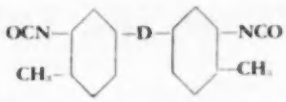
The solution of this problem, as presented in the current (copending) patents, comprises the application of condensates of certain polyhydroxy compounds, such as polymethylene glycols (USP 2,691,566), or hydroxy groups containing polymers, such as polyvinyl alcohols, starch, cellulose or polyallylalcohol (USP 2,691,567), with (a) aromatic diisocyanate dimers, and (b) with organic phosphates, phosphonates or phosphinates.

Respective proportions of "a" and "b", which are linked to the polyhydroxy compound, are within wide limits. Each of these components might be present at ratios from 5-95%.

Aromatic *diisocyanate dimers* ("a" above) are produced, according to another copending application, from aromatic isocyanates in presence of a (phosphine) catalyst. One isocyanate radicle reacts with an identical group of another molecule to form a cyclic structure, possibly:



abbreviated in the following formulas with "D". In a preferred example 2-4—toluylene—diisocyanate links with "D" to the additional dimer compound:



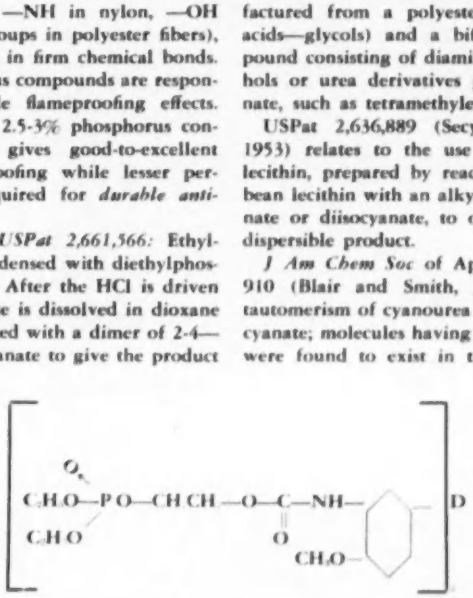
These dimers were found to be stable in contrast to unstable substances containing free isocyanate groups; the dimers also give stable condensates with the polyhydroxy compounds. This is described in both patents.

The organic phosphates ("b" above) are applied in the form of their halides, i e, as alkyl-substituted phosphoryl halides to undergo condensation with the polyhydroxy compounds.

The polyhydroxy compounds are first reacted with the alkylphosphoryl halides (b), then with the dimers (a) to give a complex condensate that has to be applied to the fibers from a solvent or emulsion. Upon the application of temperatures of 150-200° C the isocyanate adducts are split and reactive groups (presumably —NCO) adhere to the active hydrogen atoms of the fiber's molecule (—OH in cellulose and derivatives, —NH in nylon, —OH and —COOH groups in polyester fibers), thereby resulting in firm chemical bonds.

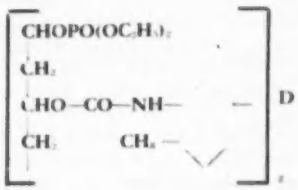
The phosphorus compounds are responsible for durable flameproofing effects. From 1.5 up to 2.5-3% phosphorus content reportedly gives good-to-excellent durable flameproofing while lesser percentages are required for *durable antistatic effects.*

Example for USPat 2,661,566: Ethylene glycol is condensed with diethylphosphoryl chloride. After the HCl is driven off the condensate is dissolved in dioxane and further reacted with a dimer of 2-4—anisylene diisocyanate to give the product



It forms a pasty mass to be applied to a cotton fabric from an aqueous emulsion; a condensate of iso-octylphenol with ethylene oxide (Igepal-type) is used as an emulsifier. The fabric becomes durably flame resistant after being dried and heated to 180-190° C. An analogous treatment of nylon renders the fabric antistatic to a high degree, the effect persisting after repeated launderings.

Example for USPat 2,661,567: Polyvinyl alcohol is reacted with diisopropyl chlorophosphate giving diisopropyl polyvinyl phosphate, which in turn is condensed with the dimerized 2-4-tolylen diisocyanate. (The following formula refers to an analogous condensate with *diethyl*-chlorophosphate):



The resulting solid is applied to cotton from solution (according to examples 2 and 3). Following heat applications at 200-220°C for 2-3 minutes a great part of the impregnating compound is found to be retained after several washing cycles. The cloth reportedly is flame resistant without afterglow when subjected to the AATCC tentative test 34-47 (*1950 Technical Manual and Year Book of the AATCC XXVI*, p 118). Applications of amounts as little as 0.05% of the treating agent are said to produce antistatic effects.

References cited by the Patent Office to USP 2,691,566:

USPat 2,625,531 (Wingfoot Corp/1953) relates to an elastomer product manufactured from a polyester (dicarboxylic acids—glycols) and a bifunctional compound consisting of diamines, amino-alcohols or urea derivatives plus a diisocyanate, such as tetramethylene diisocyanate.

USPat 2,636,889 (Secy Agricultural/1953) relates to the use of a modified lecithin, prepared by reacting crude soybean lecithin with an alkyl or aryl isocyanate or diisocyanate, to obtain an easily dispersible product.

J Am Chem Soc of April, 1934 p907-910 (Blair and Smith, Jr) reports on tautomerism of cyanourea and guanyl isocyanate; molecules having a ring structure were found to exist in tautomeric equilibrium with cyano urea and guanyl isocyanate, both of chain structure.

References cited to USPat 2,691,567:

USPat 2,277,083 (Du Pont/1942): a hydroxylate polyvinyl resin (not more than 50% of the C linked to OH) is treated with an aliphatic diisocyanate (0.1-10% of the resin's weight) and then used for film and adhesive production and for coating.

USPat 2,495,108 (Monsanto/1950): using arylphosphates of polyvinyl alcohol to form water-insoluble, nonflammable products.

J Am Chem Soc of April 1934, p907-910 (see above).

• NEWS OF THE TRADE •

• Symposium on Chelate Chemistry

A symposium on "Fundamental and Applied Advances in Chelate Chemistry" will be sponsored by the Polytechnic Institute of Brooklyn on April 29-30 in the Engineering Societies Building (29 West 39th Street, N Y C) as a feature of its centennial year celebration which is being marked under the theme "Science, Engineering, Research for Human Well-Being." Cooperating with Polytechnic in the sponsorship of the symposium are: American Cyanamid Company, General Aniline & Film Corp, Geigy Chemical Corp, Chas Pfizer & Co, Inc, Versenes, Inc, Victor Chemical Works, and Monsanto Chemical Company.

The meetings will be divided into morning and afternoon sessions, with a banquet being held on April 29 at the Midston House. Seventeen papers will be delivered, in addition to the remarks with which each session will be opened by a leading scientist. Dr W Conrad Fernelius of Pennsylvania State University is chairman of the symposium.

The program is as follows:

FUNDAMENTAL PRINCIPLES
Friday, April 29, 1955

Morning Session

W Conrad Fernelius, Pennsylvania State University, "Opening Remarks"

George E Kimball, Columbia University, "Molecular Orbital Theory"

B P Block, Pennsylvania State University, "Results of Crystal Structure Determinations"

Reed M Izatt, Mellon Institute of Industrial Research, "Enthalpy and Entropy Effects in Chelation"

Robert W Taft, Jr, Pennsylvania State University, "Rate and Equilibrium in First Complex Formation Between TTA (Thenoyltrifluoroacetone) and Aqueous Metal Ions"

Afternoon Session

G H Cartledge, Oak Ridge National Laboratory, "Opening Remarks"

Burl E Bryant, University of Oklahoma, "Results of Infra-Red Studies"

John C Bailar, Jr, University of Illinois, "Polymerization Through Chelate Formation"

Harry P Gregor, Polytechnic Institute of Brooklyn, "Polyelectrolyte-Metal Chelates"

John R Van Wazer and C F Callis, Monsanto Chemical Co, "Chelation with Phosphate Complexes"

APPLICATIONS
Saturday, April 30, 1955

Morning Session

John C Bailar, Jr, University of Illinois, "Opening Remarks"

Frederick Brody, American Cyanamid Company, "Metal Chelates as Dyes and Pigments"

G M Gantz and M E Chiddix, General Aniline and Film Corp, "Chelating Agents in the Textile Industry"

Edwin J Haertl, Versenes, Inc, "Applications to Agriculture"

Harry Kroll, Geigy Industrial Chemicals, "Applications to Agriculture"

Martin Rubin, Chemo-Medical Research Inst, Georgetown University, "Applications of Chelation to Biology and Medicine"

Afternoon Session

H Zussman, Geigy Industrial Chemicals, "Opening Remarks"

Ernest H Lyons, Jr, The Principia College, "The Influence of Coordination Chelation in Electro Deposition"

Norman Hackerman, University of Texas, "Corrosion Inhibition and Chelating Agents"

Charles J Pedersen, E I du Pont de Nemours & Co, Inc, "Oil Soluble Complexing Agents as Metal Deactivators"

G Gutzeit, General American Transportation Corp, "Applications of Chelating Agents to Metal Industries"

Professor Harry P Gregor of the Polytechnic Institute is coordinating the symposium and will provide invitations to anybody wishing to attend. Advance abstracts will also be supplied upon request. He may be reached at: Polytechnic Institute of Brooklyn, 85 Livingston Street, Brooklyn 1, N. Y.

OBITUARY

EMIL KRAEHENBUHL

EMIL KRAEHENBUHL, vice director of Ciba AG (Switzerland), died in the early morning hours of February 17th.

Dr Kraehenbuhl studied chemistry in his home town at the University of Bern, from which he was graduated "summa cum laude". He was interested from the beginning in problems of dyeing and printing, and decided to devote his time to textile printing. Upon completion of his apprenticeship and years of training in Switzerland and other countries, he took over the management of a large Romanian textile printing plant, which he managed until the early years of World War II.

In 1941 he entered the dyeing plant of the former Gesellschaft fuer Chemische Industrie in Basel, Switzerland. After a short time he was named prokurist and soon assumed the management of the entire dyeing plant of Ciba AG as vice director. Under his direction a number of important application techniques, particularly relating to fabric printing, were developed and are basic practice in the trade today.

Dr Kraehenbuhl was president of the "Schweizerischen Verein der Chemiker-Coloristen", a Swiss association resembling in character the AATCC.

JOHN H PATTMAN

JOHN H PATTMAN, a salesman in the New York area for E I du Pont de Nemours & Co, Inc, died on November 18th, 1954, after a short illness. He was 54 years old.

Mr Pattman was a member of the New York Section of the AATCC.

• National Aniline Building Major Isocyanates Plant

Construction of a multi-million-dollar plant to produce organic isocyanates at Moundsville, West Virginia, was announced earlier this month by National Aniline Division, Allied Chemical & Dye Corporation.

The new plant will be a completely integrated organic isocyanates facility, with all chemical raw materials supplied from within the Allied Chemical organization. National Aniline expects to complete the plant in forepart of 1956. The plant has been planned for production of a varied line of isocyanates, including the di-isocyanates of toluene (TDI), di-tolyl (TODI) and diphenylmethane (MDI), which are currently being supplied from National Aniline's interim commercial production at Buffalo, New York.

Located on the Ohio River, just south of Moundsville, the isocyanates plant will adjoin Solvay Process Division's new chlorine, caustic soda and chlorinated methanes plant and National Aniline's recently completed maleic anhydride, fumaric acid and catalytic aniline operations. The plant will have facilities for shipping by river barge, railroad and truck.

The new facilities will establish National Aniline Division as a major producer of isocyanates for manufacturers of polyurethane products. National Aniline plans also to provide a full range of coloring materials so that the new foams and other polyurethane products may be produced in desired colors.

• 2nd ITE to Feature Congress of Scientific Research

In connection with the Second International Textile Exhibition, set for June 25-July 10 at Brussels, Belgium, one of the most important events is to be an International Congress of Scientific Research in the Textile Industry. This will be organized mainly by the Centre Scientifique et Technique de l'Indutrie Textile Belge.

The Congress will take place June 27-29.

All inquiries concerning the Congress should be addressed to the secretary of the Congress, 24, rue Montoyer, Brussels, Belgium.

The Exhibition is the second of a series of international exhibitions of textile products, clothing and textile machinery and equipment, the first being held at Lille, France in 1951. General information may be obtained from the general secretariat: 15, rue des Drapiers, Brussels.

• Nopco Acquires New Facilities In Oregon

The Nopco Chemical Company has acquired new warehouse and office facilities at 1235 Northwest 12th Ave, Portland, Ore, and will henceforth be represented in that city by John J Ryan, industrial sales representative for the Northwest.

• 315 Graduate from Automation School

Some 315 employes representing 204 companies in 33 states and 9 foreign nations were graduated from Minneapolis-Honeywell's Industrial Division Training School in Philadelphia in 1954, M J Ladden, director of the school, has announced.

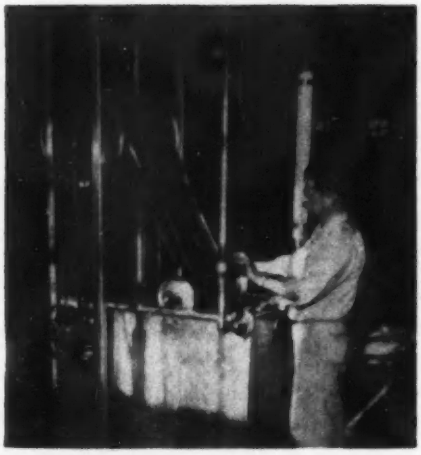
Courses covered instruction in the application of electric, pneumatic and electronic automatic recording, measuring and controlling instruments, including their repair and maintenance. The courses lasted from two to six weeks.

Last year the school graduated the 4,000th student since it began operation in 1935.

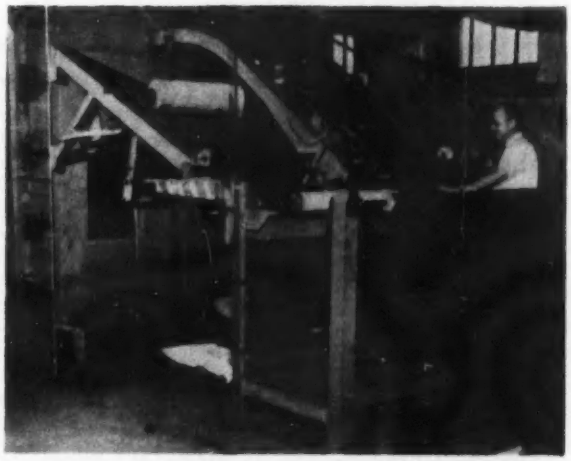
NEWER FINISHING EQUIPMENT AT LTI

Some of the newer equipment being used at the Lowell Technological Institute for the dyeing, crease resisting, and stabilization of a fabric is shown below.

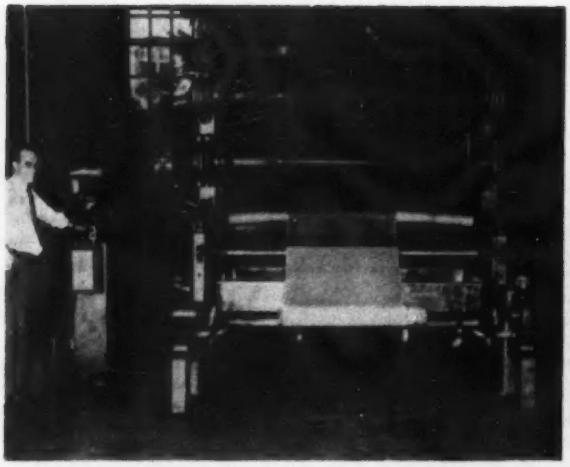
Prof John J McDonald, head of the textile finishing department where this machinery is installed, states that these units are capable of handling fabrics up to 72 inches in width.



JAMES HUNTER SAMPLE BECK—John J Lawlor of the LTI Research Foundation operates the James Hunter one-string sample beck. This is made of stainless steel with an adjustable reel and has vari-speed drive.



KENYON PIN DRYER—Associate Prof Winford S Newell, in charge of wool finishing at Lowell Tech, dries the dyed fabric. The fabric was subsequently dried with overfeed after padding with resin. This new dryer was built by Kenyon for Riggs and Lombard.



HUNTER 3-ROLL PAD—Prof McDonald is shown impregnating the fabric with resin on the James Hunter 3-roll pad. This same unit was previously used in extraction following the dyeing operation.

ANDREWS & GOODRICH ROLLER DRYER/CURER—Prof McDonald operates the Andrews & Goodrich roller dryer-curer, curing the resin-treated fabric.

• Hooker-Durez Agreement Planned

Boards of directors of Hooker Electrochemical Company, Niagara Falls, N Y, and Durez Plastics & Chemicals, Inc, North Tonawanda, N Y, have approved a formal agreement for the consolidation of the two companies, subject to approval by the stockholders of each company.

Both companies have directed the calling of special meetings of their respective stockholders on April 28, 1955 at which time the consolidation agreement will be submitted for approval.

Under the terms of the proposed consolidation, Hooker will be the continuing company. The consolidation will be effected by the issuance of one share of common stock of Hooker for each of the presently outstanding 1,650,000 shares of common stock of Durez. It is planned that the business of Durez will be continued as the Durez Plastics Division of Hooker.

Directors of Hooker and Durez, who will constitute the board of directors of the consolidated company, have announced that at the first meeting of the board of the consolidated company, it is their intention to declare a dividend of 25 cents a share on the common stock of the consolidated company for the second fiscal quarter of 1955.

• Raymond Laboratories Names National Sales Agency

Raymond Laboratories, Inc, St Paul, Minn, has announced the appointment of the M H Baker Co, also of Minneapolis, as their national sales agency to handle sales of Pendit WA Cosmetic (sodium lauryl sulfate), Pendit CA (quaternary ammonium salt), thioglycolic acid, and the salts of thioglycolic acid.

The M H Baker Company, which is expanding chemical production facilities, is currently establishing distribution outlets in New England, New York, Chicago, the Southeast and the West Coast. A nation-wide group of distributors is expected to be organized by mid-year.

Although designed primarily for cosmetic use, their products have wide application in other fields. The sodium lauryl sulfate is reported to be of high purity and excellent uniformity and is finding uses in the textile and related fields.

Pendit CA is a relatively inexpensive quaternary ammonium compound which is reported to be strongly substantive to proteins and similar materials and thus is a very effective textile and leather softener.

Thioglycolic acid is being used as an intermediate in the preparation of stabilizers, oil additives, etc.

• Stein Hall Purchases Starch Factory

Stein, Hall & Co, Inc, through its new, wholly owned subsidiary, Eastern Maine Starch Co, Inc, has purchased the plant and equipment of the Limestone Starch Company, Limestone, Me.

The new owners plan to continue operating the plant for the manufacture of potato starch, under the supervision of James H Page and David Page, vice president and assistant secretary, respectively, of the new company.

Stein, Hall & Co, Inc are importers, manufacturers and distributors of starches and starch products, with executive offices at 285 Madison Avenue, New York, N Y, and other factories at Chicago, Ill, Charlotte, N C, Pawtucket, R I, and Long Island City, N Y.

• New Construction at R-B-H

New manufacturing and shipping facilities are under construction at the Bound Brook, N J, plant of the R-B-H Dispersions Division of Interchemical Corporation. The projected units are said to have been made necessary by the continued expansion in volume and scope of R-B-H's pigment dispersion business.

Two new buildings — a two-floor wing on the main manufacturing building and a one-floor storage and shipping section — were started shortly after the first of the year. They are slated for completion by July.

The new manufacturing wing reportedly will increase production area in that unit by more than a third, and will provide on the second floor a large increase in storage space for raw materials. Shipping space and warehouse area for finished goods will be doubled.

• American Resinous Remodels Laboratories

American Resinous Chemicals Corporation has announced the completion of an extensive program of remodeling affecting all their laboratories at the Peabody, Mass, plant.

The new laboratory area includes major work areas for resin and plastic emulsions, solutions and hot melts; a constant-temperature room; special work areas for solvent adhesives and coatings containing pilot-plant processing and churning equipment; a sample room, and a conference room.

Special testing equipment is available for testing aging, oxidation, and sunlight as required for coatings for fabric or paper. Other special equipment is used for tensile and shear tests on adhesives of both emulsion and solution types.

• NSP Embarks on Expansion Program

Frank Greenwall, president of National Starch Products Inc, New York, announces that the company plans to enter immediately upon a long range program for the expansion and modernization of all company manufacturing and research facilities.

The plan, which reportedly provides for the expenditure of $3,500,000, has been approved by the Board of Directors, and will provide for the following:

1) New and modernized equipment will be installed at the Plainfield, Chicago and San Francisco plants, so as to improve adhesive manufacturing facilities.

2) Expansion and modernization of buildings and equipment at the Indianapolis plant, which will substantially increase the present starch grind, as well as the capacity for making unique specialty starches.

3) Alexander Research Laboratory, Plainfield, N J, will be doubled in size, so as to consolidate and coordinate all starch, resin and adhesive technical and research efforts in the East.

4) Equipment improvements to permit more efficient manufacture of the many new resin products introduced in the last several years.

National Starch recently announced the placing of a contract with the Blaw-Knox Co of Pittsburgh, to erect a second vinyl resin plant at Meredosia, Ill, to manufacture vinyl acetate polymers and copolymers, so as to be in a better position to supply these resins in the western markets. This new plant is expected to be in operation this summer.

• Weekly Magazine Covers Chemical Process and Product Patents

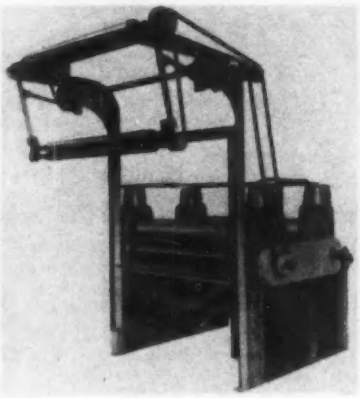
The importance of patents relating to chemistry has increased so greatly during the last 10 years that a weekly magazine, *Chemical Patgrams*, which is exclusively devoted to chemical process and product patents, is now being published.

The magazine devotes a separate page to each of the approximately 100 chemical patents which issue each week.

Calculated on a yearly basis, *Chemical Patgrams* provides substantially complete technical information about all chemical patents for a little more than a penny a patent.

Sample copies of this magazine may be obtained by writing to Chemical Patgrams, Box 5559, Washington 16, D C.

• NEW PRODUCTS AND DEVELOPMENTS •



Wiesner-Rapp Model "M-8" Dual Saturator

• "M-8" Dual Saturator

The Model "M-8" Dual Saturator, a product of Wiesner-Rapp Co, Inc, Buffalo, N Y, is designed for wetting out and applying finish to many types of fabrics.

It consists of two pair of 8"-diameter by 50"-face squeezer rolls each having stainless-steel bottom and rubber-covered top rolls. The rolls are mounted in adaptor-type bearings which in turn are mounted in stainless-steel supporting stands. There are two separate stainless-steel pad tanks with an immersion roll in each. These tanks are supported between stainless-steel side supports.

Pressure to the top rolls is supplied through Bendix-Westinghouse Rotochambers, which have no stuffing glands, in order to prevent leaking. When the air is released from the pressure side, the top roll is automatically raised out of contact with the bottom roll.

In the larger of the two tanks there is a combination plug drain and over-flow drain, which is said to make it possible to drain the tub completely or maintain a constant liquor level when so desired.

At the leaving end of the saturator there is mounted a roll-type folder equipped with stainless-steel draw roll. This folder is reported to have a maximum swing of 48".

Expanders, drive and other features can be included to meet customer requirements.

• Sunolux

Pennsylvania Salt Manufacturing Co, producers of Sunolux, a water-soluble, dry organic stabilizer, reports that the bleacheries using the new product in alkaline peroxide solutions find that it helps improve quality of work and lowers processing costs.

During extensive field tests in which leading textile manufacturers throughout the country participated, Sunolux is said to have demonstrated superior bleaching action, eliminated serious dyeing difficulties, and provided substantial savings in time and water required in rinsing. Sunolox is said to be effective in combination bleaching with chlorine and peroxide where ordinary stabilizers cannot be used, and it reportedly leaves no insoluble residues on yarns or fabrics. Finished work retains its natural softness and original colors, it is claimed.

Sunolox may be used in package machines, kiers, dye becks, pads, jigs, and string dyeing machines as well as in rope and open width continuous bleaching ranges. It is said to be harmless to the skin and delicate fibers and to be non-corrosive.

• Drusils

Culminating a 3-year research and development program, E F Drew & Co, New York, has anonunced the commercial availability of a newly developed line of silicone finishes, under the trademark of Drusil.

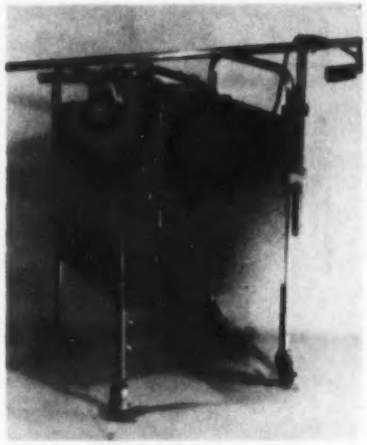
It is reported that field production runs totalling over a million yards have been made on rayon, acetate, Orlon, Dacron and wool fabrics and mixtures of same, and the manufacturer points out that the runs have proven the efficiency of these finishes and the ease and flexibility of their application.

It is claimed that, with the use of Drusil, the widest range of surface effects and hand, from a soft, silky drape to a worsted, thick or leathery hand can be obtained. Regular laundering or dry-cleaning reportedly will not alter the original desired hand.

Drew states that the application of Drusil to woolen and worsteds has produced results and effects heretofore practically unattainable with silicones. The low curing temperature possible with Drusil is said to eliminate the deleterious effects previously experienced.

• CSI Recording Tensiometer

The High Speed Recording Tensiometer developed by the Summit Research Laboratories of Celanese Corporation of America for the measurement and proper regulation of yarn tension is now a product of Custom Scientific Instruments, Inc, Arlington, N J. The instrument is equally



CSI Recording Tensiometer

applicable to the study of surfaces in contact with a running yarn. Small bearings can also be introduced into the system, resulting in tension variation patterns characteristic of the mechanical parts of the bearing.

The instrument has a frequency response up to 120 cycles per second and a sensitivity as high as four mm deflection on a standard direct writing recorder per gram of tension in the yarn. Even at this high sensitivity, it reportedly can be used under normal plant conditions. Heavy machine and plant vibrations are said to have no effect on the tensiometer, the record produced being a true one of tension variation only. The sensing head is compact and rugged, with a beam type of transducer using bonded resistance strain gauges. Stops are provided to prevent overstressing these beams. Methacrylate plastic pulleys are provided to the beams, and to use the instrument it is necessary to place the pulleys over the running yarn and twist the sensing head until the yarn forms an S shape over the pulleys.

• 1, 4-Thioxane

Thiokol Chemical Corporation, 780 North Clinton Ave, Trenton 7, N J, announces the availability of 1,4-thioxane, a water-white, mobile liquid boiling at 148.7°C/760 mm. It is said to be readily miscible with a number of solvents, and by itself, an excellent solvent for organic compounds, such as synthetic and natural resins, plastics, and elastomers. It is suggested that 1,4-Thioxane should be useful as a chemical intermediate since it readily undergoes addition and oxidation reactions.

A new product bulletin on the product is available from the manufacturer.

• New Hot Spray Vinyl

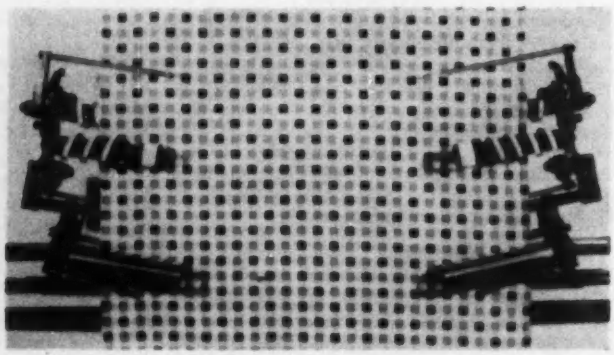
A new hot spray vinyl specifically engineered for economical and effective corrosion control has been announced by Prufcoat Laboratories, Inc, 50 East 42nd Street, New York 17, N Y. Designed to combine ease of handling and good spraying characteristics with optimum build and appearance, Prufcoat's new Hot Spray Vinyl reportedly provides 4 mils in a single spray pass. One prime and one hot spray coat are said to give the 5 to 6 mil total thickness needed in most corrosion protection work. Vinyl thicknesses in the 10 to 15 mil range without runs or sags are claimed possible in an uninterrupted multiple pass spray application.

• Improved Design in Machine For Turning Back Doubled Selvedges

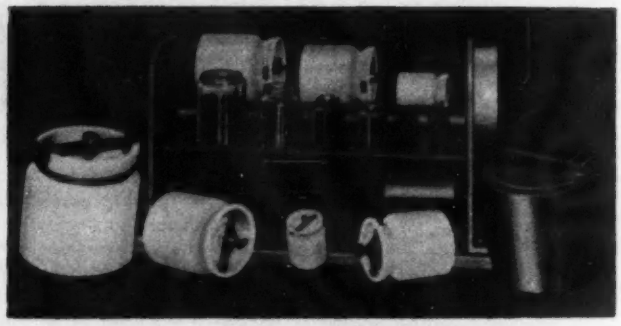
Important improvements in the design of its machine for turning back doubled selvedges have been announced by the Guider, Roll and Service Co, Daytona Beach, Fla.

As originally designed the machine had to be installed at the angle of the cloth guider to which it was attached. In cases where they were not used on guiders the brackets supplied had a fixed angle. Now, according to the Company, the machines, which are known as "taker-outers," have flexible knuckles which permit adjusting the spirals of the machine to the angle best suited to the work to be done.

Another improvement is the addition of a screw thread and clover-leaf handle, which reportedly permits the rubber or stainless steel spirals which "walk" out the doubled selvedges to be set in the best relation to each other for "nipping" the cloth and pulling it to its full width. One of these spirals fits on each side of the cloth so that doubled selvedges on either side are taken out. This adjustment can be made while the machine is in operation, thereby permitting very accurate setting of the spirals.



G, R & S Machine for Turning Back Doubled Selvedges (shown on guiders)



Abbe Jar Rolling Mill

• New Jar Rolling Mill

Paul O Abbe, Inc, Little Falls, N J, has introduced a new jar rolling mill, which is said to make possible the running of containers varying in size from 2-13" diameter by means of a movable idler roll.

By lifting the idler roll out of the notches in which it is set, the correct space for the containers to be processed is secured in a matter of seconds. Both fixed and movable rollers are equipped with sealed ball bearings which do not require lubrication.

The tray under the rolls is removable, the supports are sturdy iron castings and the entire unit is assembled on a steel base plate.

This new mill is available in two lengths — 15" and 24".

• Carbide Producing New Group of Reactive Intermediates

The first large commercial production of a group of reactive intermediates — acrolein dimer and its derivatives alpha-hydroxyadipaldehyde, hexanetriol-1,2,6, and tetrahydropyran-2-methanol — has been announced by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation.

Although these products have been known as laboratory chemicals in the past, now for the first time commercial availability makes their use on an industrial scale economically feasible.

Acrolein dimer, with its aldehyde group and ethylenic linkage, is a starting material for the preparation of synthetic resins and the synthesis of chemicals for textile finishing and other uses.

Alpha-hydroxyadipaldehyde is supplied as a stable 25 percent aqueous solution because of its high reactivity. Its three reactive groups make it an important inmediate for chemical synthesis and resin manufacture.

Hexanetriol-1,2,6 is of general interest as an alkyd and polyester resin intermediate and as a softener, moistening agent, and solvent.

Tetrahydropyran-2-methanol is of interest in the preparation of plasticizers and pharma euticals, and as a specialty solvent.

• One-Piece Fiberglas Tanks

At the Beetle Products Division of Beetle Boat Co, Inc, Grinnel St, New Bedford, Mass, fiberglas tanks embodying many desirable features are molded complete in one piece. Special advantages are said to be low cost, sturdiness, resistance to corrosion, and ease of cleaning.

Noncorrosive inside and out, the new Beetle Tanks are said to be nonconductive to static electricity and reportedly can withstand all the commonly used chemicals, as well as temperatures above boiling point. Resistance to impact is high, and any Beetle Tank can be quickly repaired on the spot by unskilled labor, it is claimed. Wall thickness is uniform, reinforced where necessary with horizontal ribs and steel rods molded into the body, and all corners are gently curved to make the tanks easy to drain and clean. They can be equipped to order with dam overflow for cold or hot water rinses.

Tanks, trucks and tubs are available in any size required. All tanks of 300 gallon capacity or over have extra ply bottom.

• Ultrapole S Improvement

Ultra Chemical Works, Inc, 2 Wood St, Paterson, N J, has improved its Ultrapole S Liquid (97-100% Active) to a point where this amine condensate is now very nearly odorless. Its color is a very pale amber.

Characteristics of the product include a pH of 9.2 in a 1% solution, high metal-salts resistance, good alkali and fair acid resistance. Its detergency on cotton, wool and rayon is said to be very good. Ultrapole S is reported to be compatible with soap, most sulfated oils and with sulfated or sulfonated synthetics detergents. It has also found use as an emulsifying agent under specific conditions.

Stocks are carried in Charlotte, Atlanta, Chicago, and at Ultra's plants in Joliet, Ill, and Los Angeles. Samples and data sheets are available from the manufacturer on request.

• "Cravenette" WSR

The Cravenette Company, USA, Hoboken, N J, has added to its line of water-repelling preparations and textile finishes, a new silicone repellent for woolens, worsteds, blends of wool or worsted with either Dacron or acrylic fibers. The product is being offered as "Cravenette" Super Silicone Water Repellent (ordering code "Cravenette WSR").

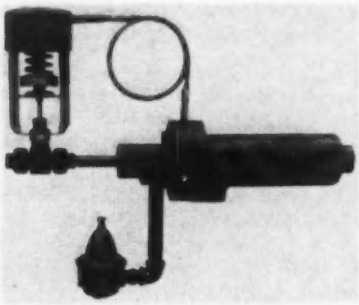
The manufacturer points out that no catalyst or curing temperatures are necessary, as the repellent is merely mixed with water and applied. It is claimed that maximum results are obtained, with complete drying, at 200-240°F in five or six minutes. Fabrics treated with the new repellent are said to show high resistance to non-oily spots and stains, and excellent hand. It is claimed that woolens are actually upgraded.

• New Steam and Water Mixer

A new steam and water mixer, which utilizes full heat energy by injecting steam directly into the water, has been developed by Fulton Sylphon Division of Robertshaw-Fulton Controls Company, Knoxville, Tenn.

The steam-water mixer, called the No. 1360 series, may be used wherever hot water is required, and steam and water are available. Safety feature on the new control will shut down the mixer in the event of failure of the water supply. Operation is automatically resumed when the interference is corrected.

The new sensing bulb design reportedly has twice the surface area of conventional bulbs. The turbulent blending action occurring on the interior of the annular-designed bulb produces instantaneous response of the powerful thermostatic assembly and insures steady, accurate control of water temperature at the desired point, according to Company engineers.



Steam-water mixer by Fulton Sylphon Division of Robertshaw-Fulton Controls Company contains powerful thermostatic assembly for accurate control of water temperature

The mixing chamber of the No. 1360 is designed to prevent stratification and false temperature indications. The inherent noise accompanying direct injection of live steam into water is said to be held to an acceptable level by the infinitely variable orifice feature of the steam injection nozzle.

The control, available in five temperature ranges, is said to be 15 percent lower in cost than previous models offered by the Company.

• Humitex Circular and Strip Charts

Perfection of a new type chart paper with special properties which are said to improve the legibility of instrument records has been announced by The Foxboro Company, Foxboro, Mass.

The new Humitex circular and strip charts are printed under controlled humidity conditions on a white sulfite sheet to which special sizing agents have been added to permit sharp, distinct recording without "feathering."

Scale markings and time arcs are printed in a neutral gray for contrast with colored recording inks. Circular charts are printed and center-punched in the same operation, reportedly holding eccentricity tolerance of less than .002" between hub hole and scale circles. The printing plates are produced to tolerances of .00025".

The charts were designed for use with Type 1500 General Purpose Ink and Type 316 stainless-steel pens to provide a complete set of precision recording components for the company's line of recording instruments.

A sample circular chart will be sent by Foxboro on request.

• Carbowax Polyethylene Glycol 20M

Carbowax polyethylene glycol 20M with an estimated molecular weight of 15,000 and 20,000 was recently announced by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. The new product is available in carload quantities. It is the tenth member of Carbide's series of Carbowax polyethylene glycols and gives the series a molecular weight range of 200 to 20,000.

This new product is said to be a water-soluble, white solid with the binding, suspending, and lubricating properties typical of the polyethylene glycol compounds. It is reported that both the melt viscosity and aqueous solution viscosity of Carbowax 20M are considerably higher than those of Carbowax polyethylene glycol 6000, and films formed with 20M are stronger and harder than those formed with other solid polyethylene glycols.

The solution viscosity of Carbowax polyethylene glycol 20M is said to be about twice that of equivalent gum arabic solutions. It should be of interest to the textile industry as a water-soluble binder in starch sizes and synthetic detergent cakes.

• Sylmer

Demonstrations of the various properties Sylmer imparts to fabrics were given by Dow Corning Corporation representatives in January in showrooms of several manufacturers of upholstered furniture in Chicago, New York and Grand Rapids, Mich. Sylmer, a silicone-based finish, is applied to fabrics in the piece goods stage by finishers licensed by Dow Corning, manufacturers of the finishing compound.

Sylmer-treated materials are said to be resistant to water-borne stains and spots, and Dow Corning representatives were on hand to show that oil-borne spots may be removed without leaving a solvent ring, that the strength and abrasive qualities are improved, and that the process gives fabrics a softer, richer hand.

A few months previous to January markets the new finish was available only on a custom order basis. Its introduction on stock lines of concerns manufacturing upholstered furniture launched the process in the volume category.

It is understood that Sylmer finish may be applied to fabrics of every content and weight. Its performance is said to be equally impressive on sheer gossamer casements, as on heavy loose textures woven with Lurex metallic yarn.

• Epoxy Resin Emulsion

The development of Epoxy Resin Water Emulsion by Chemical Products Corp, Little Falls, N J, has led to many versatile applications, including several in the textile processing field.

It is claimed that this resin emulsion is compatible with, may be blended with, and may be compounded with almost all resin emulsions or plasticizers to meet the most rigorous requirements. When blended with amine, aldehyde, amid and phenolic resins, it reportedly produces thermosetting compositions which are tough, flexible, and water- and solvent resistant.

On textiles, the new resin emulsion is said to enhance the quality, hand and appearance. It reportedly deposits a colorless, odorless, lustrous, water-resistant film without mark-off, thereby not affecting the color of the dye or print.

• New Industrial Thermometer Emphasizes Readability

Advanced styling employing a U shaped extrusion provides a broader calibration area and combats distortion of markings and figures in the new Scientific Industrial Thermometer.

The "U" scale combined with highly magnified tubing and bright red reading mercury is said to provide outstanding readability. Standard finish is the popular chrome, and special colors are available by request.

Scientific Industrial Thermometers have multi-pointed tubes, individually engraved scales, and are calibrated with National Bureau of Standards Certified Thermometers.

For further information write to Scientific Instrument Co, Dept B-2, 1041 Second Ave, Detroit 26, Mich.

• Automatic Pipe Welding

A high-speed process of automatic pipe welding, introduced last year by E C Wolferz Alloy Equipment, Belleville, N J, appears to have attained several important advantages over the hand-welded type. Besides the savings due to faster production, the automatic process reportedly assures a much more uniform weld, with complete penetration of the seam affected, either with or without an inside bead.

In working stainless steel pipe, all welds are wetted, also automatically, immediately following the moving weld. This is said to reduce carbide precipitation to a minimum, resulting in a stronger weld, together with an additional benefit of practically eliminating the usual distortion caused by the intense welding heat.

This method of welding also is said to do away with the need for tacking prior to welding.

NAMES IN THE NEWS

Gibbons

Eckler

Atkins

At the March meeting of the board of directors of the General Aniline & Film Corp, FRANCIS A GIBBONS was elected senior vice president. With GAF for the past 25 years, Mr Gibbons has been vice president—finance and previously served as treasurer and as secretary of the Corporation. In his new post he will retain supervision over company finances as well as assisting the president in the direction of the company's operations.

GAF has also named LEOPOLD ECKLER a vice president of the Corporation and general manager of its Ansco D.vision. Dr Eckler, who has been general manager of the Plastics Division of the Celanese Corp of America, will be returning to General Aniline after an absence of six years. He previously was with the Ansco Division from 1928 to 1948.

L P WENZELL has been transferred from the Development Department of Celanese Corporation of America to the new position of manager of special industrial developments in the Market Development Department of the Textile Division of the Company.

Before joining Celanese in 1953, Mr Wenzell had been with the U S Bureau of Mines, Kolker Chemical Works and Monsanto Chemical Company.

THEODORE C OHART has been appointed manager—marketing of General Electric Company's Silicone Products Department.

Mr Ohart, who has been with G-E since 1929, was formerly retail sales manager for the Lamp Division.

V E ATKINS has been named general manager of American Cyanamid Company's Organic Chemical Division, succeeding L C DUNCAN, who has become general manager of the Company's Lederle Laboratories Division.

Mr Atkins, who moves up from the post of assistant general manager, has been with Cyanamid since 1936.

Philadelphia Quartz Company, Philadelphia, Pa, has announced the election of additional officers—three vice-presidents, JOHN C RUSSELL—sales, CHARLES E RAMSEY—traffic, and THOMAS ELKINTON—executive and personnel; and an assistant treasurer, J MORRIS EVANS.

The company also has appointed LeROY R FISHER as sales manager and T MARVIN HENNESSY as traffic manager.

The appointment of JOSEPH L KEARNS as technical sales and national accounts representative of Stearate Chemical Sales for the Warwick Chemical Division of Sun Chemical Corporation was recently announced.

In his new position, Mr Kearns will be responsible for Stearate sales to Warwick house accounts and to its nationwide network of distributors.

Mr Kearns was previously associated with Desert Tan, Inc, as Eastern District manager, with A Gross and Company, and with Dewar Chemical Company.

Proctor & Schwartz, Inc, Philadelphia, has announced the resignation of H RAYMOND ZAYOTTI, manager of their New England Sales and Service Branch at Newton Upper Falls, Mass since 1943.

Mr Zayotti has accepted an executive position with Forte, Dupee, Sawyer Co, of Boston, in its processing organization at Needham Heights, Mass.

The Proctor & Schwartz shop at Newton Upper Falls will continue to operate as a service and repair shop with JIM HENRY continuing as service manager. Machinery sales will be handled through Proctor's office in the Howard Building, in Providence, R I, under C W SCHWARTZ, 3rd, with PHILLIP PLOUFFE continuing his sales and service work.

CALCO

dyelines

Advertisement No. 42 of a series

Calco

Pure Golden Yellow Shades

Improved Printing Properties—More Efficient Operation

Calcosol Golden Yellow GKWP Double Paste is now widely used in the printing field for producing golden yellow shades and is extensively used in the formulating of olive green, tan and brown shades of medium to heavy depth, principally on cottons and viscose rayons. In addition to excelling in purity of shade, this Calcosol dye has highly desirable non-drying, non-flaking characteristics, plus much greater resistance to specking or settling in the barrel. At the same time, it retains suitable fluidity to make "dipping" possible.

With these physical superiorities of the paste, Calcosol Golden Yellow GKWP also insures *more rapid fixation* of the dye. It works well in the majority of the commercial gums, including those with high alkali content.

It has excellent printing and ageing properties, and ample wash fastness and light fastness for the usual vat color prints.

Calcosol Golden Yellow GKWP Double Paste has proved to be a highly satisfactory, efficient and economical dye. Complete details on request.

QUICK TIPS

Continuous Washing Ranges: For more even water flow and more efficient washing, replace customary circular pipe inlet and outlet with a weir water inlet across one end, and a weir overflow at the other end of the wash box.

Approximately Uniform Exhaust Rate is produced by adding salt in gradually increasing portions rather than equal portions when dyeing in circulating machines, dye-becks, etc. For example: Add 20% salt in portions of 2%, 4%, 6%, 16%.

Less Loose Dye Adheres to Fibers if you add compatible synthetic detergent to acidic oxidising or coupling bath. Cuts down soaping, crocking. Applicable in nitrous acid baths and acidic peroxide baths with vat dyes on many fibers; in Beta Oxy Napthoic Acid developing baths on acetate and nylon.

CALCOSOL GOLDEN ORANGE 3G PASTE

Gives Maximum Fastness...Speeds Accurate Shade Matching...in Dyeing Process, in Inspection Room

Stability of shade to soaping is one of the outstanding characteristics of this member of the Calco vat dye family. Calcosol Golden Orange 3G Paste dyes a pleasing bright yellow orange, with negligible change of shade or strength after soaping.

Since sensitivity to heat and moisture is also negligible, a true shade is obtained quickly with a minimum of sampling during the dyeing process.

Fast diffusion and slow exhaustion rate – with resulting level dyeing characteristic – makes Calcosol Golden Orange 3G Paste highly suitable for use as a shading color, in combination with such dyes as Calcoloid Yellow GCD Paste, Calcosol Brown R Paste, Calcosol Brown G Double Paste, Calcosol Brown 2G Double Paste, and Calcosol Olive R Paste.

For the same reason, Calcosol Golden Orange 3G Paste is level dyeing on viscose skeins or on packages. (As is generally true in vat dyeing viscose skeins, tendering of the fiber is *prevented* by using ⅛ to ¼ oz. of tannic acid, per gallon of dye bath.

Calcosol Golden Orange 3G Paste dyes a good union on cotton-viscose fabrics; and it dyes wool readily. Dyeings show negligible shades change when resin finished. Calcosol Golden Orange 3G Paste is highly satisfactory for light and medium grounds to be discharge printed.

Recommendations: Calcosol Golden Orange 3G Paste is suitable for all end-uses because its general fastness properties are very good.

It is particularly desirable for lighter shades as well as for shading, where maximum levelness and fastness* are required. Since it does not tender the fiber when material is subjected to prolonged sun exposure, it may be used for curtains and draperies. Calcosol Golden Orange 3G Paste is also recommended for colored effects in fabrics which are to be chlorine bleached after weaving, because it does not tender the fiber during the chlorine bleaching.

**Fastness Properties on Cotton*

Light (Fade-Ometer)	
Light Shade	5-6
Medium Shade	6
Dark Shade	6-7
Wash Test No. 3	4-5
Pressing	5
Water Spotting	5
Crocking	5
Dry Cleaning	3-4
Chlorine	5

A Cyanamid Original Still Leads the Grays

As a base for gray shades, and as a bluing agent for fashionable colors, nothing excels the neutral dye Calcochrome Alizarine Gray 2BLS originated by Cyanamid nearly ten years ago. When dyed neutral, it gives a better color value than the acid dyeing types. Among other uses, it is currently busy making Army Green Shade #44 and Air Force Blue Shade #84.

It can be applied as an acid dye, neutral dyeing dye, and by all three chrome methods: Top, Meta, and Bottom.

Five pounds of raw material are used to produce one pound of Calco dye.

Gaston County

DYEING EQUIPMENT

Engineered to Save

TIME and MONEY

ON EVERY DYEING OPERATION

SYNTHETICS • BLENDS • WOOL • COTTON

GREATER FLEXIBILITY
Gaston County Combination dyeing machines are completely adaptable to your individual dyeing requirements. With a simple change of material carriers you can switch to any type packaging, either natural or synthetic.

SUPERIOR DYEING RESULTS
Gaston County Dyemaster controls operate independently from the loading to the unloading of the kiers — guard quality through every phase of the dyeing operation.

TODAY'S MOST RUGGED CONSTRUCTION
Gaston County dyeing equipment is famous for its rugged construction — enjoys a decided preference among leading mills for high-temperature, high-pressure dyeing of synthetic yarns.

WRITE FOR NEW LITERATURE
Gaston County offers a complete range of dyeing equipment . . . designed to meet the specific need of any size operation — no matter how large or how small.

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TEXTILE
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for
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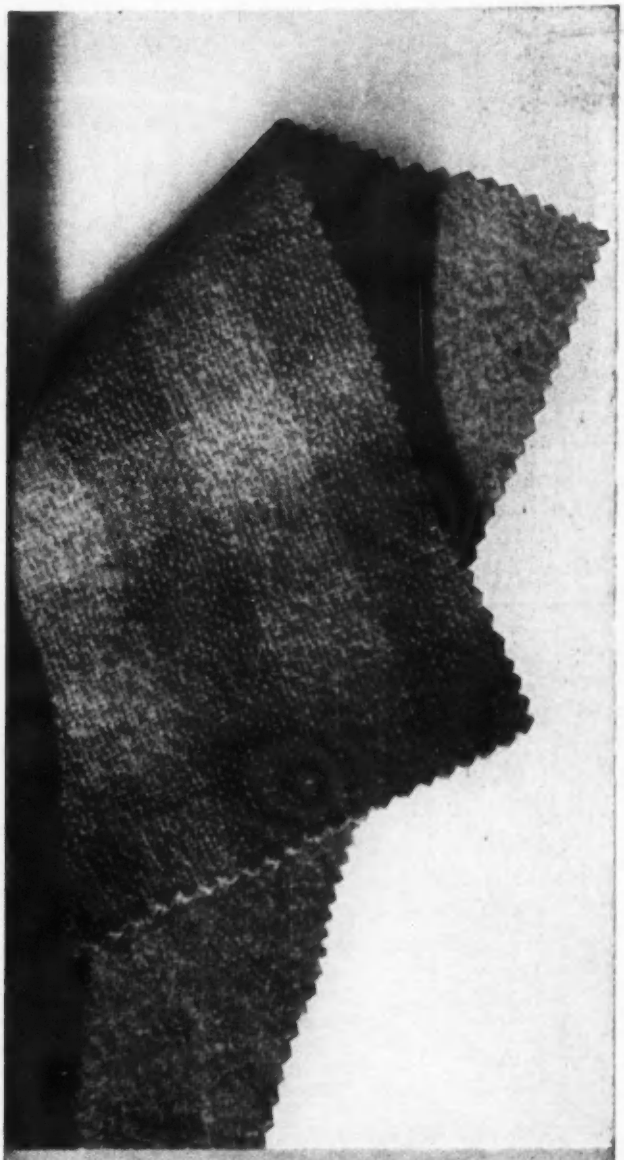

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ABSTRACTING SERVICE—Abstracting and digesting of foreign patents and periodicals. Literature review and special reports in dyestuff and cellulose chemistry. PAUL WENGRAF, 88-36 ELMHURST AVENUE, ELMHURST 73, NEW YORK.

CONFIDENTIAL EMPLOYMENT SERVICE

If you are available for a good position in textiles, it will pay you to have your application in our files. Negotiations are confidential through us.

CHARLES P. RAYMOND SERVICE, Inc.
Phone: LIberty 2-6547
294 Washington St., Boston 8, Mass.
Over 55 Years In Business

POSITION WANTED: Textile graduate, age 39, married, 16 years supervisor in dye application laboratory, shade matching cotton, wool, synthetic, stock, yarn, piece goods. Also some plant experience in each. Desires position as dyer or dyer chemist-colorist. Write Box No. 863.

POSITION WANTED: TEXTILE CHEMIST AND COLORIST. Expert in laboratory standardizing and testing of all classes of dyes on all fibers, dyeing, and printing. Experienced in technical sales and plant trouble shooting. Expert color matcher. Write Box No. 857.

CHEMIST—for plant and laboratory work on synthetic piece goods. Metropolitan area. Write Box No. 860.

DYER WANTED: Man with hosiery dyeing experience for Philadelphia area. Write Box No. 865.

POSITION WANTED: Textile Colorist and/or Chemist. Married. 15 years' diversified experience wet processing control, dyeing of nylon, wool and blends in laboratory with some plant dyeing. Energetic and hard worker. Will consider offer anywhere. Write Box No. 866.

POSITION WANTED: Experienced mill Textile Colorist and Chemist with Textile College and Dyestuff Company laboratory background. Worked with acetate, vat, direct, acid, basic, rapidogen, lacquer and aridye pigment printing. Good understanding of dyeing and finishing. Desires mill, technical service or sales position. Write Box No. 867.

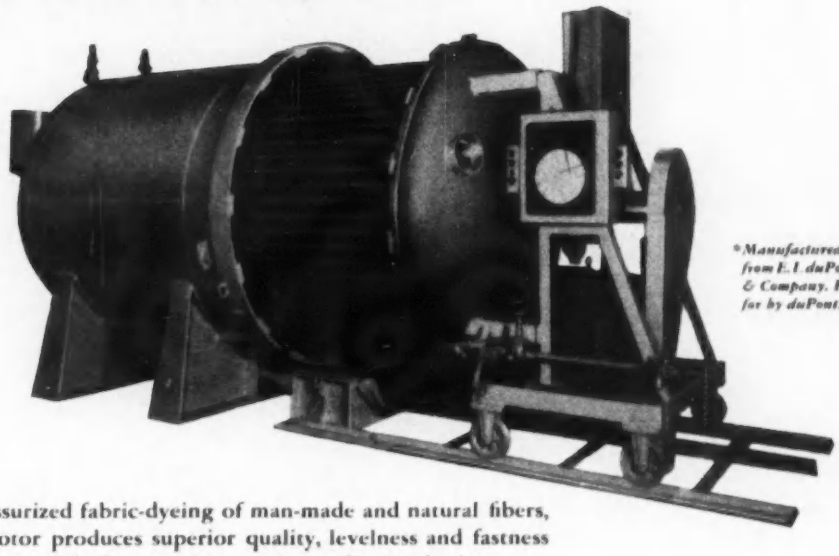
Try

A

Classified

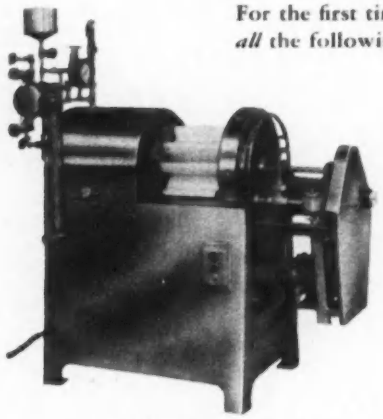
WIESNER-RAPP
BAROTOR*

. . . for Pressure-Dyeing Fabrics



*Manufactured under license from E. I. duPont de Nemours & Company. Patent applied for by duPont.

Ideal for pressurized fabric-dyeing of man-made and natural fibers, this new Barotor produces superior quality, levelness and fastness in the full range of shades on a large-scale production basis.



LAB SIZE BAROTOR has all the basic features of the large production model Barotor. It is functionally designed for use in test dyeing to accurately predetermine large scale production results and also for laboratory use in dye and process development.

For the first time, this newly developed dyeing machine incorporates *all* the following 12 important features for superior dyeing:

- Fabrics open width at all times.
- Tensionless.
- All points in uniform and frequent bath contact.
- Rapid bath circulation and agitation.
- Operable with all woven fabric construction, both filament and spun.
- Widely adaptable for batch size.
- Have no need for attention during dyeing.
- Excellent duplication of conditions between laboratory and production scale.
- Fabric sampling and bath additions made without opening vessel and losing pressure, time or heat.
- Samples representative of the entire fabric.
- Cylindrical shape with maximum utilization of dyeing space.
- Investment commensurate with productivity in comparison with atmospheric dyeing.

In addition, *the patented quick opening door*, an exclusive Wiesner-Rapp feature, greatly reduces the dyeing cycle time. Write today for complete information.

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TIGHT-STRAND WASHER

MULTI-STAGE WASHER

DYE BECK

3-ROLL PADDER

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THE WIESNER-RAPP CO., INC.

1612 SENECA ST., BUFFALO 10, N. Y.

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